C

Postwar Transit Plan for Municipal Railway City & County of San Francisco

---

Parts 1 to 4 Inclusive

LEONARD V. NEWTON
Consulting Engineer
Public Utilities Commission

not accepted
[illegible]

I N D E X

	Page
Letter of Transmittal	1 - 20
Postwar Transit Plan	21
Part I	22
Removal of Outer Tracks on Market Street .	22
Street Car Lines to Remain Primary Lines .	22
Number of New Street Cars Required	24
Street Car Lines to Become Trackless Trolley or Motor Coach Lines	25
Number of New Trolley Coaches and Motor Coaches Required	26
Description of Routes	27 - 30
Estimate of Cost	31
Rolling Stock	31
Track Work, Overhead Plant, and Paving	32
Detailed Estimates	33 - 51
Part II	52
Street Car Lines to Remain Primary Lines . .	52
Number of New Street Cars Required	54
Street Car Lines to Become Trackless Trolley or Motor Coach Lines	55 - 59
Number of New Trolley Coaches and Motor Coaches Required	59

Page

Table of Contents . . . . . 1 - 2

Preface 3

Part I 5

Introduction to Tests Leading to Design Charts . . 5

Tests on Lines to Smooth Laminar Flow . . 20

Effect of Low Inlet Pressure 36

Tests on Lines to Develop Transition Profile in Short Venturi Lines 47

Effect of the Profile Shape and Other Variables 61

Conclusions . . . . . 71 - 72

Bibliography 73

Table of Contents 74

Table Index, Figure Index, and Table . 75

Appendix Bibliography . . . . . 76 - 77

Part II 78

Tests on Lines to Smooth Laminar Flow . . 79

Effect of Low Inlet Pressure 81

Tests on Lines to Develop Transition Profile in Short Venturi Lines . . . . . 82 - 83

Effect of the Profile Shape and Other Variables 84

Page

PART II (Cont'd)

Description of Routes . . . . . 55 - 59

Estimate of Cost 61

Rolling Stock 61

Track Work, Overhead Plant, and Paving . 61

Detailed Estimates . . . . . 62 - 77

PART III 78

Street Car Lines - Recommendations on those lines not treated in Parts I or II . . . . . 78 - 87

Estimate of Cost 88

Rolling Stock 88

Track Work, Overhead Plant Removed, Paving 88

Detailed Estimates . . . . . 89 - 94

PART IV 95

Motor Coach Lines . . . . . 95 - 106

Replacement of Existing Motor Coaches 107

Addenda 108

Consolidated Statement - Passengers Carried . .108

Consolidated Statement - Passengers Carried per Vehicles Operated 109

Consolidated Statement - Maximum Number of Vehicles Operated 110

Consolidated Statement - Maximum Carrying Capacity of Vehicles Operated 111

Addenda (Cont'd)

Page

Market Street Railway Co. - Passengers Carried . . 112

Market Street Railway Co. - Mileage Operated . . . 113

Market Street Railway Co. - Maximum Number of Vehicles Operated 114

Municipal Railway of S.F. - Passengers Carried . . 115

Municipal Railway of S.F. - Mileage Operated . . . 116

Municipal Railway of S.F. - Maximum Number of Vehicles Operated 117

Population Forecast - San Francisco and Northern Portion San Mateo County . . . . . 118 - 125

Riding Habit 126

Forecast of Revenue Passengers 127

Postwar Rolling Stock . . . . . 128 - 134

Age of Rolling Stock 135

Street Cars - Municipal Division 135

Motor Coaches - Municipal Division 136

Trolley Coaches - Municipal Division 137

Street Cars - Market Division 138

Cable Cars - Market Division 139

Motor Coaches - Market Division 140

Trolley Coaches - Market Division 141

Addenda (Cont'd) Page

Car Hours Presently Operated 142

Comparative Statement 143

Present Schedules vs. Proposed Post War Schedules 143

Trolley Coach Operation 144

Akron, Ohio 144-145

Seattle, Washington 146-147

Maps 148

Street Car Lines - Post War 148

Trolley Coach Lines - Post War 149

Motor Coach Lines 150

Track Removal 151

PUBLIC UTILITIES COMMISSION

City and County of San Francisco

Consulting Engineer
58 Sutter Street
San Francisco 4.

April 16, 1945.

Mr. E.G. Cahill, Manager,
Public Utilities Commission,
City and County of San Francisco,
San Francisco, California.

Dear Sir:

Herewith is submitted Report entitled "Postwar Transit Plan", Parts I to IV inclusive, for the City and County of San Francisco.

In the preparation of this plan the Consulting Engineer has studied the various reports and plans prepared by other Engineers for the City, said reports dating back to 1913.

War traffic conditions have not been used in the development of the magnitude of rolling stock requirements or of the Postwar Plan itself; rather I have reviewed transit requirements prevailing prior to 1942, when gasoline and tire rationing began, and have arrived at a modification of transit requirements in the immediate prewar years as a basis for forecasting future transportation needs.

A riding habit of 272 rides per capita per annum is used, this being the average riding habit of 1940-1941. This is 27% less than the riding habit of 377 which prevailed in 1944.

In preparing this plan, the Consulting Engineer has attempted to hold changes in routing of the various existing lines to a minimum.

In the absence of complete data on origin and destination of transit patrons I have assumed that present routings, developed over a period of years, meet the requirements of the City fairly well, and therefore the best plan seemed to be to review these existing lines and recommend changes or abandonments only where same were absolutely necessary.

Changes or elimination of mass transportation routes affect real estate values. Full cognizance of this phase of the problem has been given consideration and it is contended that the superior transit service to be afforded by the proposed plan will increase the value of real estate in the City, due to improved accessibility of its various parts or sections.

In preparing this plan to show immediate postwar financial requirements to provide for new rolling stock and rehabilitation of track and overhead plant, full consideration has been given to the final transit plan involving segregation of mass transit vehicles of primary lines from surface interference. This plan, Parts I to IV inclusive, now submitted

[illegible]

[illegible]

[illegible]

may be considered therefore as the first stage of the final plan and no monies expended for rolling stock in this stage will be lost when the final plan is provided.

Population forecasts are contained in this report, and in arriving at rolling stock requirements full cognizance was given to this phase of the matter. As shown in study entitled "Population Forecast" the conclusion was reached that in 1950 the total population of San Francisco (civilian and military resident) would be 745,000 as compared with 823,755 on December 31, 1944, a decrease of 78,755 or 9.5%. Peninsula population from the northern county line to the southern limits of San Mateo is estimated at 96,639 in 1950. The combined population that the Municipal Railway will directly serve in 1950 is therefore estimated to be 920,394.

It is generally agreed that in the postwar period, when gasoline and tires are again available "ration free", that considerable mass transit riding will be lost to private automobiles.

There is, however, a very definite limitation on the wide usage of private automobiles for transportation between the home and place of work or business, also for use

[illegible]

[illegible]

[illegible]

by the downtown shopper, and that is parking space. While new parking facilities will most likely be provided in the postwar period, we may safely assume that if conditions are fairly normal so far as employment is concerned that chief reliance must be made on mass transit to carry the large fraction of the traveling public who will use street cars or coaches, provided service is adequate and good.

It is the writer's belief that in the postwar period, as soon as conditions are stabilized, that mass transit riding will approximate 1940-1941 levels, and with good service provided that the total number of revenue and transfer passengers transported annually will be 250,000,000.

In determining rolling stock requirements therefore, the writer has approximated the carrying capacity of all vehicles used by the Municipal and Market Street Railways in 1940-1941, making due allowance however for the elimination of competition which existed before consolidation.

The suggested improvement in public transportation has been considered in steps or stages as follows:

PART I

Market Street -- Removal of two outer tracks on Market Street from the Ferry Building to Valencia Street.

The following primary street car lines now operating on Market Street to continue as such over present routes except for minor modification or extension, and to be provided with new modified P.C.C. electric street cars.

"B" Geary

"C" California

"D" Van Ness

"K" Market

"L" Taraval

"N" Judah

#3M Sutter-Jackson

#4M Sutter-Sacramento

#7M Haight-Ocean

*#17M Haight-Ingleside

*Presently operated on Market Street from Haight to 12th Street.

The following street car lines now operating on Market Street to be converted to basic trolley coach lines with motor coaches used during the peak rush hours to augment the trolley coaches. Present routes to be employed except for necessary modification to provide for loops at terminals where required, and/or to provide for extentions or elimina-

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

tions as shown on detailed description of proposed routes.

#1M Sutter

#2M Sutter

"J" Church

"M" Ocean View

#5M McAllister

#6M Haight

#21M Hayes

#31M Balboa

Trolley and motor coaches when operating on Market Street will use the traffic lane next to the curb on both sides of the street and make near-side stops to take on and discharge passengers.

The ban on automobile parking now in effect on Market Street and other downtown streets must be continued to insure the most efficient use of street space for the large majority of the public; further to permit of the free flow of trolley coaches on that street.

It will also be desirable to restrict to non-rush hours loading and unloading of motor trucks on all these streets in the congested downtown district where mass transit

vehicles are operated. This plan has been in successful use in Los Angeles for a number of years past, and is currently in use.

PART II

The following primary street car lines should continue over present routes except for modification or extension as shown in detailed description of routes. Present street cars on these lines to be replaced with new modified P.C.C. electric street cars.

#14M Mission (Daly City)

#12M Mission (Geneva Avenue)

"H" Van Ness (extended to County Line)

"F" Stockton (extended to S.P. Depot)

The following lines now employing combination of street cars and motor coaches, or either alone, should be converted to basic trolley coach with motor coaches to augment them in the rush hours.

#15M Third Kearny (Trolley and Motor Coach)

#19M Polk-Larkin-9th (extended to S.P. Depot) - (Trolley Coach only)

#25M San Bruno (Trolley Coach only)

#24M Castro-Divisadero-Fillmore (Trolley Coach only)

#26M Guerrero and Daly City (Trolley and Motor Coach)

#22M Fillmore (Trolley Coach)

#41M 2nd and Market - S.P. Depot (Motor Coach only)

PART III

The following existing street car lines not treated in Parts I or II are treated in Part III.

"E" Union

To be converted to trolley coach line.

#9M Valencia

Now street car line. To be abandoned.

#11M Mission and 24th

Now street car line. Inner portion of line to be abandoned. Outer portion of line to be continued by motor coach.

#12M Ingleside and Ocean

To be abandoned as such and route served by motor coaches (Sloat Boulevard) -- street cars (Ocean, Onondaga and Mission Street) of "K"-(New 12)-14 lines.

#20M Ellis and O'Farrell

Now street car. To be abandoned. Portion of route to be served by extended "F" line.

#27M Bryant

Now street car. To be continued by motor coach.

#36M Folsom

Now street car. To be abandoned entirely.

[illegible]

[illegible]

[illegible]

#17M Haight and Ingleside

That portion of street car line on 20th Avenue from Judah Street to Wawona Street and on Wawona Street from 19th Avenue to 20th Avenue to be abandoned.

#40 San Mateo Interurban

To be abandoned as a street car line, and 2 motor coach routes to be established.

PART IV

This section covers the existing motor coach routes and makes recommendations for route changes where same is deemed necessary.

#1 Park
#10M Glen Park

Consolidation of the two routes recommended.

#2 Irving-Noriega

Extension recommended.

#3 Park-Presidio-Mission

It is recommended that this line be made 2 lines instead of 1; further that route modifications be made.

#4 Embarcadero

Increase in service recommended.

#5 Marina

No change recommended.

#6 Eureka-Diamond

Elimination of part of route recommended.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

#7 Miraloma

Extension of route recommended so as to afford transfer privilege at Monterey Boulevard with combined #1-#10 coach lines.

#9 Bayshore

Abandonment of this line recommended so as to eliminate duplication of service.

#11 Telegraph Hill

No changes recommended.

#14 Roosevelt Way

Elimination of portion of route recommended so as to eliminate duplication of service.

#4M Sutter

No change recommended.

#10M Glen Park

To be combined with #1 Park coach line.

#12M Ingleside and Ocean

To be abandoned entirely.

#15M Third and Kearny

Increase in service recommended - also inauguration of express service.

#19M Polk-Larkin-9th Street

Extension of route to S.P. Depot recommended.

#23M Richland Avenue

Abandonment of this line recommended as soon as shuttle coach line is provided on Crescent Avenue.

#24M Castro-Divisadero-Fillmore

No route change recommended. Conversion to trolley coach line as soon as possible urged.

#25M San Bruno

Elimination of portion of route recommended when full coach service is offered.

#26M Guerrero

No change recommended.

#27M Bryant

Increase in service recommended when full coach service is offered.

#28M Ferry-S.P. Depot

Abandonment of this line recommended.

#35M 24th Street

Revision and curtailment of present route recommended.

#44M East Bay Terminal-Sansome Street

No change recommended.

#50M Geneva

No change recommended at this time. When the Defense Housing Project now being built on Geneva Avenue between Bayshore Boulevard and the Cow Palace is completed, service on the #50M line should be increased.

#51M Silver Avenue

No Change recommended.

#52M Excelsior

No change recommended.

#53M Southern Heights

No change recommended.

#54M Hunter's Point

No change recommended.

#55M Sacramento-Clay

Abandonment recommended.

#70M Hunter's Point Shuttle

Service curtailment recommended.

Parts I to IV inclusive recommend that the following rolling stock be purchased for replacement of existing vehicles.

Part	Street Cars	Trolley Coaches	Motor Coaches
I	217	127	55
II	96	96	34
III	---	---	22
IV	---	---	104
TOTAL	313	223	215

There is included in this report a section entitled "Age of Rolling Stock".

It is shown that street cars in the Municipal Division have an average age of 29 years -- 167 cars or 76.5% are 25 years of age or over.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Year	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

[illegible]

[illegible]

In the Market Division the average age of street cars is 24 years -- 176 cars or 40% are 25 years of age or over. It should be noted however that practically all street cars of the Market Street Railway Company which were built in their own shops employed second-hand trucks and motors; hence while it would appear that the Market Division had a higher percentage of newer street cars, such is not actually the case. All of these cars are obsolete in design and should be replaced when new vehicles are available.

All street cars now owned by the Municipal Railway with the exception of 5 new cars acquired in 1939 are obsolete in design and performance. Municipal Railway cars are in better condition than Market Street Railway cars; hence the latter should be replaced first.

Since December 7, 1941 (Pearl Harbor) all street cars have carried severe overloads, and have not been maintained as well as in the prewar period. This is due to shortage of manpower and maintenance material. It may be expected therefore that when the war is over the street cars now in service, with the exception of 5, will be worn out.

No provision is made in this report for the replacement of 18 trolley coaches now in service. It is felt that all of these vehicles will operate successfully and economically for at least five years more.

The purchase of 215 motor coaches is recommended, 104 of which are for replacement of existing motor coaches.

In the Municipal Division the average age of motor coaches is 3.8 years -- however 29 are 5 years of age or over as of April 1, 1945.

In the Market Division the average age of motor coaches is 5 years -- there are 75 coaches 5 years of age or over as of April 1, 1945.

In other words, at present the combined coach fleet has 104 coaches that should be replaced within the next 5 years, if it is agreed that a 10 year life is proper. In view of the heavy war time demands imposed on these coaches together with poor maintenance due to manpower and maintenance material shortage, it is the writer's belief that the estimated 10 year life is very conservative.

No provision is made in this report for the replacement of existing cable car lines. I strongly recommend that cable cars be continued in operation as long as possible. They have been nationally advertised as a San Francisco attraction and are an intregal part of San Francisco.

I also strongly recommend that the operative property of the California Street Cable Railroad Company be acquired by the City and County of San Francisco and merged with the Municipal Railway.

The problem of this paper begins in September, 1964 at which time the beginning of statistics courses.

In the accompanying tabulation the number of major students is 6.8 years -- because 10 are 2 years of age or older is at least 1, 1964.

In the fourth tabulation the number has it taken students is 8 years -- there are 70 students 8 years of age or older as of April 1, 1964.

In other words, if present the statistical course first has 10 students that should be enrolled within the next 8 years, it is to be hoped that a 10 year life is ahead. In view of the fact the time demands imposed on these students beginning with poor mathematics can be remembered and mathematics minded students, it is the statistic belief that the statistics 10 year life is very conservative.

No provision is made in this report for the problem-what of relating costs-benefits. I strongly recommend that costs also be established in monetary as long as possible. Then have some statistically alert-bent in a non-financial or-ganization and get an unbiased view of the first-hand.

I did strongly recommend the the operative program-it of the statistics, should first be defined, designed, operated by the City and County of San Francisco and monitor with the community welfare.

Operating economies could be effected by consolidating the Cable operations of the Municipal Railway and the private company; further the citizens of San Francisco would be assured of the continuance of cable car operation on California, Hyde and Jones Streets.

As is shown in comparative statement contained in this report, the total number of vehicles proposed for schedule in the postwar plan is 794 as compared with 720 presently operated. The increase therefore is 74, or 10%. This should result in more frequent service.

In that trolley and motor coaches are substituted for streetcars, and the latter have greater carrying capacity (seated and standing passengers), the overall carrying capacity of the proposed fleet of 794 vehicles is 10,130 or 12% less than the present scheduled fleet.

In arriving at this conclusion, no cognizance was given to superior performance of new as compared with present vehicles. We have every reason to believe that the new vehicles will have a potential scheduled speed, greater than the present vehicles. If this superior ability is evaluated or recognized, the comparison of carrying capacity might be more favorable.

It has been shown that the writer expects a reduction in the total number of passengers carried per annum in the postwar years to 1950 of 27%.

On this assumption, an increase in the number of vehicles scheduled of 10%, thereby improving headway, with a decrease in overall carrying capacity of 12% is compatible with an expected decrease of patronage of 27%.

It is impossible to evaluate the reduction in track and roadway maintenance cost that will ensue in the postwar period when 145.02 miles of single track are removed and 35.22 miles of single track are reconstructed.

It has been shown that the action

depends a definition in the first number of

transformations - number and action in the product

depend in turn on [illegible].

In this manner, an increase in the

number of positive commutations of any, thereby the

circuit [illegible], also a decrease in overall commutation

necessary to [illegible] in compatible with an increase

and [illegible] in [illegible] in [illegible].

In the commutation in polarity the resultant

in order to [illegible] commutations have [illegible] which

in the [illegible] [illegible] [illegible] [illegible] [illegible]

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

[illegible] [illegible].

Also it is impossible to evaluate the reduction in vehicle maintenance cost that will ensue when all old vehicles are replaced with modern vehicles.

Another large potential saving per annum will come through reduction in "step" and "falling-in-car" accidents due to modern vehicles operating with doors closed -- further with control equipment conducive to smooth operation.

Parts I to IV inclusive contemplate the removal of 145.02 miles of single track and the reconstruction of 35.22 miles of single track.

Also, provision is made for rehabilitation of overhead plant that will remain in service, the removal of abandoned overhead plant and the construction of necessary new overhead plant for trolley coach operation.

As shown in detail work sheets, provision is also made for conversion of certain car barns to house trolley and motor coaches.

also it is impossible to evaluate the consequence of certain assumptions that have not been made clear yet or contained not explicitly with certain statements.

Another large problem arises when some sort of some thought experiment is "stuck" and difficulties because some — further with certain points of assumptions or some further — it is.

There is no it contained assumption, the amount of 110,00 miles or twice those of the circumnavigation is 30,00 miles of equator round.

Also, providing in mind the assumptions of another place that will result in further, the amount of additional energy, in the sun or the assumption of another has overhead also the further some assumption.

As about a [illegible] is assuming is also more for [illegible] if [illegible] is not clear to which energy and motor speed.

The estimated cost of replacement of existing rolling stock; track, overhead rehabilitation and paving rehabilitation; track, overhead removal and paving on abandoned lines; and other improvements recommended in Parts I to IV inclusive are as follows.

Part I	$ 12,300,763.00
Part II	$ 8,042,860.00
Part III	$ 1,475,903.00
Part IV	$ 1,549,600.00
TOTAL	$ 23,369,126.00

Estimates of cost were prepared by the Public Utilities Bureau of Engineering, and the writer expresses herewith appreciation for the assistance and cooperation given him by Messrs. Turner, Degnan, Perrin and VonHeusen.

Also, I desire to thank Messrs. Scott and Ormsby for furnishing me with data requested, and for their suggestions and advice.

All estimates of cost include 5% for Engineering and 10% for Contingencies.

[illegible]

[illegible]

[illegible]

The proposed expenditure of $23,369,126.00 covers the complete rehabilitation of the rolling stock, track, pavement in track area, and overhead plant and facilities of the Municipal Railway.

It also covers the removal of track and overhead facilities which will no longer be used, as well as the restoration of pavement in the track area.

If the plan is approved, as I hope it will be, and is placed in effect, San Francisco will have fine, modern, safe and efficient surface transportation facilities.

Providing that proper fiscal arrangements are made, Parts I, II and III of the plan could be completed in 3 years after new vehicles and materials are made available. Part IV of the plan, covering the replacement of existing motor coaches, covers a 5-year period.

As has already been stated, this plan now submitted if adopted will give San Francisco a fine surface transportation system. I do not offer it as a rapid transit system. It is true that if new modern vehicles are acquired and placed in operation, an improvement in scheduled speed will ensue.

It is also true that the speed of these vehicles is governed by the number of stops per mile made to take on and discharge passengers, and by the impediments of surface travel, i.e., traffic lights, street intersections, and pedestrians, automobile and truck interference.

This has been recognized in other cities such as New York, Boston, Philadelphia and Chicago where subways and/or elevated roads have been provided for mass transit vehicles. In Washington, D.C; Cleveland, Ohio; and Toronto, Canada, plans have been completed for subways to provide rapid transit.

The plan herewith submitted will in no way conflict with future segregation of the transit facilities of primary lines.

A study is being made of such segregation, and recommendations and findings will be reported to you and your honorable Public Utilities Commission at a future date.

Respectfully submitted,

L.V. Newton
Consulting Engineer

4-16-45

[illegible]

[illegible]

[illegible]

POSTWAR TRANSIT PLAN

Parts I, II and III of the Postwar Plan herewith submitted cover the rolling stock requirements, rehabilitation of track which will be continued in service, removal of track where same will no longer be used, street paving where necessary, rehabilitation of overhead plant or removal, provision for overhead plant for trolley coaches and conversion of car barns to trolley and motor coach storage.

The projects embraced in these sections of the Postwar Transit Plan cover the immediate postwar period.

In preparing this portion of the plan, we have given proper cognizance to the final stages of the transit plan involving segregation of primary transit lines to provide San Francisco with rapid transit. We have also studied plans for Freeway development as now conceived by the State of California, or under study by the Planning Commission of the City and County of San Francisco.

At this writing it would appear that no Freeway routes have definitely been established in San Francisco. We urge that when such routes are determined full consideration be given this transit plan; further that in so far as may be desirable provision be made on Freeways for mass transit vehicles.

PART I

Recognizing that Market Street is the main artery of transit in San Francisco; further that we must continue that street as a primary mass transportation inlet and outlet; further that any transit changes must recognize convenience to the rider, provide direct, fast and safe transportation consistent with economic consideration, I recommend as the first step in the postwar modernization program that:

(a) The two outer tracks on Market Street be removed from Valencia Street to the Ferry Building.

(b) The following street car lines now operating on Market Street be continued.

Line	Route
"B"	Geary
"C"	California
"D"	Van Ness
"K"	Market
"L"	Taraval
"N"	Judah
3	Sutter-Jackson
4	Sutter-Sacramento
7	Haight-Ocean
17	Haight-Ingleside

[illegible]

[illegible]

[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

(c) All electric street cars now operated on the above lines are old and obsolete in design.

By the time that the war ends and new equipment is again available, they should be replaced with modern street cars of the President's Conference type modified for 2-man operation; and further, for operation in tandem or train formation.

Cars of the Municipal Railway prior to consolidation were superior to those acquired from the Market Street Railway Company. In making replacement of cars therefore in the postwar period, it is suggested that Municipal Railway cars be retained until all old Market Street Railway type cars are replaced.

Cars however should be shifted so that all new President's Conference cars are employed on primary routes so as to avoid mixing old and new cars on the same route. If this is not done, full advantage can not be realized from the superior operating characteristics of the new cars.

The number of cars needed to fill maximum schedule requirements in the immediate postwar period is herewith given.

For comparative purposes, the maximum number of cars operated at present, also maximum number of cars operated

in 1941 (immediate prewar) is shown.

Line	Number of Cars Needed Immediate Postwar	Number Of Cars Operated Now	Number Of Cars Operated 1941
"B"	28	28	28
"C"	25	25	25
"D"	14	15	14
"K"	26	23	26
"L"	26	29	26
"N"	29	31	29
3	12	13	9
4	7	7	10
7	15	14	15
17	15	17	15
TOTAL	197	202	197

The above tabulation shows that 197 President's Conference electric street cars of modified type will be required to fill maximum schedule requirements as estimated or forecast in the immediate postwar period.

In addition, 20 cars will be required as proper provision for spare cars. Total number of new street cars required for the above lines will therefore be 217.

(d) It is recommended that electric trolley coaches and motor coaches be acquired to replace street cars now operated on Market Street on the following lines:

Line	Route
1	Sutter and California
2	Sutter and Clement
"J"	Church
"M"	Ocean View
5	McAllister
6	Haight and Masonic
21	Hayes
31	Balboa

The number of trolley coaches and coaches needed to fill maximum schedule requirements in the immediate postwar period is herewith given.

For comparative purposes, the maximum number of cars operated at present, also maximum number of cars operated

in 1941 (immediate prewar) is shown.

Line	Number of Trolley Coaches Needed Immediate Postwar	Number of Coaches Needed Immediate Postwar	Number of Street Cars Operated Now	Number of Street Cars Operated 1941
1)			18	12
)	24	10		
2)			9	12
"J"	17	8	18	17
"M"*	None	2	10	None
5	24	12	22	24
6	14	None	12	14
21	18	9	18	18
31	18	9	18	23
TOTAL	115	50	125	120

*See modification of route

Above tabulation shows that 115 trolley coaches and 50 motor coaches, a total of 165 vehicles, will be required to replace 125 street cars now operated, and to fill maximum schedule requirements as estimated or forecast in the immediate postwar period.

In addition, 12 trolley coaches and 5 coaches will be required as proper provision for spare vehicles. Total number of new trolley coaches required therefore is 127, and total number of new motor coaches required is 55. Total new vehicles - 182.

DESCRIPTION OF ROUTES

1A (Trolley Coach)

From Bush and Sansome Streets via Sansome, Pine (through Laurel Hill Cemetery) to Parker to Clement to 33rd Avenue to Geary to 32nd Avenue to Clement, Parker, Bush (extended through Laurel Hill Cemetery) to Sansome Street.

1B (Motor Coach)

From Ferry Building via Market, Sansome, Pine, Parker, Clement, 33rd, Geary, 32nd, Clement, Parker, Bush, Sansome Street.

Motor Coaches to operate local inbound from 33rd Avenue to Presidio, thence express or non-stop to Van Ness Avenue, thence local to Sansome Street.

Outbound motor coaches to operate local Sansome Street to Van Ness Avenue, express or non-stop to Presidio, local 33rd Avenue.

Note - If this routing is approved, "B" line cars should be routed from 33rd Avenue and Geary Boulevard via Geary to Sutro Baths. No additional cars will be required for this route as compared with present route. Also see suggested extension of #31 Route.

It is further recommended that #2 route be combined with #1, as the routing through Laurel Hill Cemetery tract will be the most direct; further, patrons now using #1 or #2 cars on California Street will have only 1 block to walk. Walking

transfer privilege should be allowed between #1 route and California Street Cable Railroad Company.

"J" (Trolley Coach)

No change in route, except for loop at outer end, further paving of private right of way.

"J" (Motor Coach)

No change in route, except for loop at outer end, and paving of private right of way.

Motor coaches to operate local inbound from 30th and Church Streets to Market Street, then express or non-stop to 9th Street, then local to Ferry Building.

Motor coaches to operate local outbound from Ferry Building to 9th Street, then express to Church Street, then local to the end of the line.

5 (Trolley Coach)

No change in route, except for loop at outer end.

5 (Motor Coach)

No change in route, except for loop at outer end.

Motor coaches to operate local inbound from Beach to 6th Avenue and Fulton Street, then express to Market Street, then local to East Bay Terminal.

Motor coaches to operate local outbound from East Bay Terminal to McAllister Street, then express to 6th Avenue

and Fulton Street, then local to end of line.

6 (Trolley Coach)

No change in route except for loop at outer terminal of line.

21 (Trolley Coach)

No change in route except for loop at outer terminal of line.

21 (Motor Coach)

No chan e in route except for loop at outer terminal of line.

Motor coaches to operate local inbound from 8th Avenue and Clement Street to Divisadero Street, then express to Market Street, then local to Ferry Building.

Motor coaches to operate local outbound from Ferry Building to Hayes Street, then express to Divisadero Street, then local to end of line.

31 (Trolley Coach)

Beginning at Ferry Building, via Market, Eddy, Divisadero, Turk, Balboa to 47th, to Cabrillo to 48th to Balboa, Turk, Market to Ferry Building.

31 (Motor Coach)

To operate over same route described above.

Motor coaches to operate local inbound from 48th

[illegible]

[illegible]

[illegible]

Avenue to 6th Avenue, then express to Market Street, then local to Ferry Building.

Motor coaches to operate local outbound from Ferry Building to Eddy, then express to 6th Avenue and Balboa Street, then local to end of line.

Note- If extension of #31 line to the Beach is approved, "B" line can be extended to Sutro Baths via Geary Street from 33rd Avenue.

"M" (Motor Coach)

Beginning at St.Francis Circle, thence via Junipero Serra Blvd., Worcester Avenue, Randolph Street, Orizaba Avenue, Broad Street, Plymouth Avenue, Sickles Avenue, Mission Street, Huron Avenue, Sickles Avenue, and return.

This route is the same in part as traversed by the #3 Coach line prior to the restoration of street car service on the "M" line in December, 1944.

CAR HOUSE FACILITIES

It is recommended that Sutro and McAllister Car Barns be converted into trolley coach and motor coach storage buildings.

[illegible]

[illegible]

[illegible]

ESTIMATED COST OF PART I

The estimated cost of rolling stock, track rehabilitation, or removal, paving, also rehabilitation of overhead plant is herewith given. Also is shown the estimated cost of converting two existing car barns into suitable buildings for trolley and motor coach storage.

Estimates of cost were prepared by the Power and Utilities Engineering Bureau of the Public Utilities Commission.

217 Electric Cars, President's Conference type, modified, double end, multiple unit operation, 50'10" @ $27,300.00 each, including freight and California Use Tax.....$5,924,100.00

127 Electric Trolley Coaches, 44-Passenger, @ $16,100.00 each, including freight and California Use Tax.....$2,044,700.00

55 Motor Coaches, 44-Passenger, @ $14,900.00 each, including freight and California Use Tax.....$ 819,500.00

Sub-total, Rolling Stock.....$8,788,300.00

[illegible]

[illegible]

[illegible]

Track work and paving, removal of abandoned trackage and overhead plant	$2,760,163.00
Trolley coach overhead construction for various routes	526,400.00
Trolley coach overhead in streets adjacent to car houses	15,900.00
Sub-total, Track and Overhead Plant	$3,312,463.00
Conversion of Sutro car barn to house trolley coaches	$ 53,000.00
Conversion of Sutro car barn to house motor coaches	20,000.00
Conversion of McAllister car barn to house trolley coaches	107,000.00
Conversion of McAllister car barn to house motor coaches	20,000.00
Sub-total, Building Alteration	$ 200,000.00
Grand Total, All Projects of Part I	$12,300,763.00

In estimating the cost of track removal, the Power and Utilities Engineering Bureau assumed that in 1/3 of the mileage the entire track structure, including ties, will be removed; and that in 2/3 of the mileage the rails only will be removed, leaving the ties in place.

Were the ties removed from the entire mileage of track removed, the cost would be increased $645,357.00.

Detail of all work to be performed on projects under Part I is herewith given.

	Quantity	Unit Price	Amount
Remove girder rail construction in paved streets and repave single track	18.21 mi.S.T.	$33,500	$613,385.*
Remove rails only in paved streets and repave rail trenches	32.43 mi.S.T.	13,600	441,048.*
Reconstruct inner tracks, Market St.	4.42 mi.S.T.	98,500	435,370.
New special work			
Sutter & Market	Lump sum		15,600.
Geary & Market	Lump sum		15,600.
Remove open track, single track	5.86 mi.S.T.	3,500	20,510.
Reconstruct tracks, Twin Peaks Tunnel	2.00 mi.S.T.	25,000	50,000.

(Continued next page)

		Quantity	Unit Price	Amount
Reconstruct tracks, various, as below:		11.00 mi.S.T.	$97,500	$1,072,500.
Ocean Avenue	3.6 mi.S.T.			
Onondaga Avenue	0.6 " "			
Sutter, Fillmore to Van Ness	1.3 " "			
Jackson St.	1.4 " "			
Presidio Avenue	0.8 " "			
Height Street, Market to Baker & Central to Stanyan	3.3 " "			
	11.0			
Paving right of way, Church Street line 18th to 22nd Street		70,000 s.f.	.50	35,000.
Removing trolley poles and wire		7.05 lin. mi.	3,000	21,150.
Miscellaneous facilities for operating personnel, etc. at Sutro and McAllister Car Houses				50,000.
			TOTAL	$2,760,163.

*NOTE: These items are estimated on the assumption that in 1/3 of the mileage, the entire track structure, including ties will be removed; and that in 2/3 of the mileage the rails only will be removed leaving the ties in place. If the ties are removed from the entire mileage the cost will be increased by $645,357.

L.V.D.
3-23-45

PART I

RECAPITULATION OF ESTIMATED COST
OF TROLLEY COACH OVERHEAD CONSTRUCTION BY ROUTES
POST WAR CONVERSION

Route 1-A	Pine, Bush & Clement Sts.	$175,700.
Route J	Market & Church Streets Plus Ferry Loop	74,500.
Route 6	Haight St., Parnassus & 9th Ave.	56,998.
Route 21	Hayes St. & 8th Ave. Plus Bridge Loop	47,600.
Route 31	Turk, Eddy, Balboa, 45th Ave. & Cabrillo	92,000.
Route 5	McAllister & Fulton Sts.	79,600.
	GRAND TOTAL	$526,398.

ABOVE ROUTED PER PART I AS LISTED BY E.V.H. 2-15-45

W.C.E.
3-6-45

Table 2

[illegible]

[illegible]

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]

[illegible]

[illegible]

ESTIMATED COST OF

TROLLEY COACH OVERHEAD CONSTRUCTION

Route 1-A	Pine, Bush & Clement Sts.	
	Sansome St., Bush to Pine. Poles existing 1-Way Span Const. .07 Mi. @ $8,250	$ 578.
	Pine St., Sansome to Presidio Ave. Poles Required 1-Way Bracket Const. 2.56 Mi. @ $24,900	63,744.
	Bush St., Sansome to Presidio Ave. Poles Required 1-Way Bracket Const. 2.56 Mi. @ $24,900	63,744.
	Presidio Ave., Pine to Bush, Poles existing 1-Way Span Const. .07 Mi. @ $8,250	578.
	Cemetery, Presidio Ave. to Parker, Poles required 2-Way Span Const. .46 Mi. @ $33,500	15,410.
	Parker Ave. & Cemetery, to Euclid, Arguello, Clement to 32nd Ave. Poles existing 2-Way Span Construction 1.85 Mi. @ $14,200	26,270.
	Clement St., 32nd Ave. to 33rd to Geary to 32nd, Poles existing. 1-Way Span Construction .25 Mi. @ $8,250	2,063.
	32nd Ave. Geary to Clement, Poles required 1-Way Bracket Construction .13 Mi. @ $24,900	3,237.
	TOTAL	$175,624.

Say $175,700.

W.C.E.
3-6-45

[illegible]

ESTIMATED COST OF

TROLLEY COACH OVERHEAD CONSTRUCTION

Route J	Market & Church Sts. Plus Ferry Loop	
	Ferry Loop. Poles existing	$ 3,000.
	Market St., Ferry Loop to Church to Day St. Poles existing 2-Way Span Construction 4.47 Mi. @ $14,200	63,474.
	Church St., Day to 30th St. Poles existing 1-Way Span Construction .06 Mi. @ $8,250	495.
	Church & 30th Sts. to Sanchez, Day, and Church. Poles required. 1-Way Bracket Construction 30 Mi. @ $24,900	7,470.
	TOTAL	$74,439.

Say $74,500.

W.C.E.
3-6-45

ESTIMATED COST OF

TROLLEY COACH OVERHEAD CONSTRUCTION

Route 6	Haight St., Parnassus & 9th Ave.	
	From Haight & Market Sts., along Haight, Masonic, Frederick, Clayton, Carl, Stanyan, Parnassus, Judah, 9th Ave. to Ortega. Poles existing. 2-Way Span Construction. 3.50 Mi. @ $14,200	$49,700.
	9th Ave., Ortega to Pacheco. Poles existing. 1-Way Span Construction. .13 Mi. @ $8,250	1,073.
	9th Ave. & Pacheco to 10th Ave. to Ortega to 9th Avenue Poles required. 1-Way Bracket Construction. .25 Mi. @ $24,900.	6,225.
	TOTAL	$56,998.

Say $57,000.

W.C.E.
3-6-45

[illegible]

ESTIMATED COST OF

TROLLEY COACH OVERHEAD CONSTRUCTION

Route 21	Hayes St. & 8th Ave. Plus Bridge Loop	
	Bay Bridge Terminal Loop. Poles existing. 1-Way Span Construction .38 Mi. @ $8,250	$ 3,135.
	Hayes St., Market to Stanyan to Fulton. Poles existing. 2-Way Span Construction. 2.27 Mi. @ $14,200	32,234.
	8th Ave. Fulton to Geary. Poles existing 2-way Span Construction. .52 Mi. @ $14,200	7,384.
	Geary St., 8th Ave. to 9th Ave. Poles existing. 1-Way Span Construction. .06 Mi. @ $8,250	495.
	9th Ave., Geary to Clement. Poles required. 1-Way Bracket Construction. .13 Mi. @ $24,900	3,237.
	8th Ave., Clement to Geary. Poles existing. 1-Way Span Construction. .13 Mi. @ $8,250	1,073.
	TOTAL	$47,558.

Say $47,600.

W.C.E.
3-6-45

ESTIMATED COST OF

TROLLEY COACH OVERHEAD CONSTRUCTION

Route 31	Turk, Eddy, Balboa, 45th Ave. and Cabrillo	
	Eddy St., Market St. to Divisadero. Poles existing. 1-Way Span Construction 1.77 Mi. @ $8,250	$14,603.
	Turk St., Market St. to Divisadero. Poles existing. 1-Way Span Construction. 1.68 Mi. @ $8,250	13,860.
	Divisadero St., Eddy to Turk. Poles existing. 1-Way Span Construction. .07 Mi. @ $8,250	578.
	From Turk & Divisadero along Turk, Arguello, Balboa to 31st Ave. Poles existing. 2-Way Span Construction. 2.88 Mi. @ $14,200	40,896.
	Balboa St., 31st Ave. to 33rd. Poles required. 2-Way Span Construction. .12 Mi. @ $33,500	4,020.
	From Balboa & 33rd Avenue along Balboa, 45th Avenue. Cabrillo to La Playa. Poles existing. 2-Way Span Construction. 1.06 Mi. @ $14,200	15,052.
	Cabrillo Loop, between La Playa & Great Highway Pole existing 0.11 Mi.	3,000.
	TOTAL	$92,009.

Say $92,000.

W.C.E.
3-6-45

ESTIMATED COST OF

TROLLEY COACH OVERHEAD CONSTRUCTION

Route 5	McAllister & Fulton Sts.	
	McAllister St., Market to Central Avenue, thru McAllister St. Yard. Fulton Street, Masonic to LaPlaya; La Playa, Fulton to Cabrillo. Poles existing. 2-Way Span Construction 5.60 Mi. @ $14,200	$79,520.

Say $79,600.

W.C.E.
3-6-45

ESTIMATED COST OF

TROLLEY COACH OVERHEAD ON STREETS

ADJACENT TO CARBARNS

Sutro Carbarn

California St., 32nd Ave. to Lincoln Park, poles existing 2-Way Span Construction .052 Mi. @ $14,200.	$ 738.
32nd Ave. Clement to California St. Poles required. 2-Way Span Construction .13 Mi. @ $33,500.	4,355.
	$ 5,093.

Say $5,100.

McAllister St. Carbarn

From Fulton & Masonic Ave. along Fulton to Central to McAllister to Masonic to Fulton. Poles required. 2-Way Span Construction .32 Mi. @ $33,500.	$10,720.

Say $10,800.

$15,900.

W.C.E.
3-7-45

[illegible]

[illegible]

[illegible]

ESTIMATED COST OF

CONVERTING EXISTING CAR HOUSES TO TROLLEY COACH STORAGE YARDS

Sutro Car House

Yard to accommodate 28 Trolley Coaches

Demolition of Existing Structures	$ 1,000.
Improvements, including Paving, Structures, Overhead, etc. (but not including Grading) @ $1500/coach	42,000.
2-Way Span Construction on California St. & on 32nd Ave.	5,100.
	$ 48,100.
Allowance 10% for Contingencies	4,810.
	$ 52,910.

Say $53,000.

McAllister Car House

Yard to accommodate 56 Trolley Coaches

Demolition of Existing Structures	$ 2,000.
Improvements, including Paving, Structures, Overhead, etc. (but not including Grading) @ $1500/coach	84,000.
2-Way Span Construction on Streets 4 sides of Yard	10,800.
	$ 96,800.
Allowance 10% for Contingencies	9,680.
	$106,480.

Say $107,000.

$160,000.

F.L.R.
3-8-45

[illegible]

[illegible] ESTIMATE FOR A GROUP OF TEACHER [illegible] FROM DE [illegible]

Entry Fee Model

Year to accommodate 30 teaching staffs

Installation of Main/Air Conditioners Interconnecting, including Vents, Ducting, [illegible] (but not including heating) @ £[illegible]/[illegible]	£ 1,000.
Heavy Duty Electrical Supply on Utilities [illegible] @ £[illegible]/[illegible]	£[illegible].
Allowance LCM for Contingencies	£ [illegible].
	£ [illegible].

Say £[illegible].

Modified Fee Model

Year to accommodate 30 Staff/Student Groups

Installing of Central Air-Conditioner Interconnecting, Ducting, Vents, Interconnecting, Ducting, etc. (but not including heating) @ £[illegible]/[illegible]	£ [illegible].
E.Mr Heavy Duty Electrical on Utilities @ £[illegible]/[illegible]	£[illegible].
Allowance LCM for Contingencies	£ [illegible].
	£[illegible].

Say £[illegible],000.

£[illegible],000.

J.L.A.
8-8-[illegible]

DETAILS OF TRACK REMOVAL AND TROLLEY COACH OVERHEAD COSTS

(a) Removal of two outer tracks on Market St. from Valencia Street to Ferry Building.

Remove North Track - 11,694') Track removal in all
" South " - 11,654') streets should include repaving of streets

Leave two loops at Ferry and install crossover on South side of Loop.

(b) Following car lines now operating on Market St. be continued:

B)
C) Install new special work at Geary and Market
D)

K)
L) No special work required.
N)

3)
4) Install new special work at Sutter and Market.

7)
17) No special work required.

(c) .....

(d) It is recommended that electric trolley coaches replace street cars (now operated on Market St.) on the following lines:

1, 2, J, 5, 6, 21, 31.

Description of Routes.

1-A (Trolley Coach)

Bush and Sansome via Sansome, Pine (thru Laurel Hill Cemetery), Euclid, Clement, 33rd Ave., Geary, 32nd Ave., Clement, Euclid, Bush (extended thru Laurel Hill Cemetery) to Sansome St.

E.V.H.
2-16-45

1-A (Trolley Coach) Cont'd.

Track removal: Sutter St. - Fillmore to Presidio.
Presidio - Sutter to California
California - Presidio Ave. to 6th Ave.

10,026' of Double Track.

Parker Ave. - California to Euclid
Euclid Ave. - Parker to Arguello
Arguello Blvd. - Euclid to Clement
Clement - Arguello to 6th Ave.

3,843' of Double Track

Clement St. - 6th Ave. to 33rd Ave.
33rd Ave. - Clement to Geary St.

9,150' of Double Track.

Sutro C.H. Track

5,678' of Single Track
(Mostly T-Rail in open track)

33rd Ave. R/W. track remains in Sutro Car House to be abandoned. Make Trolley Coach yard.

Trolley Coach Overhead:

Sansome St. - Bush to Pine

344' no trolley poles required.
Single run.

Pine St. - Sansome to Euclid Ave.

16,235' trolley poles required.
Single run.

Bush St. - Sansome to Euclid Ave.

15,885' trolley poles required.
Single run.

Euclid and Parker to Arguello to
Clement to 33rd Ave.

27,915' no trolley poles required.
Double run.

33rd and Clement to Geary to 32nd Ave.
1,010' no trolley poles required.
Single run.

E.V.H.
2-16-45

1-A (Trolley Coach) Cont'd.

32nd Ave. - Geary to Clement

700' trolley poles required.
Single run.

SUTRO TROLLEY COACH YARD

J (Trolley Coach)

Same route as at present with loop at outer end.

Track Removal: Church St. - Market to 18th St.
R/W 18th St. to 22nd St.
Church St. - 22nd St. to 30th St.

7,109' double track in paving
2,600' " " " R/W(open track)

Paving R/W R/W 18th St. to 22nd St.

2600'

Trolley Coach Overhead

Ferry Loop.

690' no trolley poles required.
Single run.

Market St. - Ferry Loop to Church St.

14,148' no trolley poles required.
Double run.

Church St. - Market to Day St.

9,449' no trolley poles required.
Double run.

Church St. c/L Day St. to c/L 30th St.

292' no trolley poles required.
Single run.

30th St. - Church to Sanchez
Sanchez - 30th to Day St.
Day St. - Sanchez to Church St.

1,577' trolley poles required.
Single run.

E.V.H.
2-16-45

5 (Trolley Coach)

Same route as at present with Loop at La Playa and Cabrillo.

Track Removal: McAllister St. - Market to Central Ave.
Fulton St. - Masonic Ave. to La Playa

28,357' of double track.

McAllister Car House yard

6,241' of single track (open track)

Convert McAllister yard to Trolley Coach Yard. Wreck present building.

Trolley Coach Overhead

McAllister St. - Market to Central Ave., thru McAllister Yard,
Fulton St. - Masonic to LaPlaya
La Playa - Fulton St. to Cabrillo St.

29,558' no trolley poles required. Double Run.

MC ALLISTER TROLLEY COACH YARD

6. (Trolley Coach)

Same route as at present with Loop at outer end.

Track Removal: Masonic Ave. - Oak to Page Sts.

389' single track.

Masonic Ave. - Page to Frederick
Frederick St. - Masonic to Clayton
Clayton - Frederick to Carl
Carl - Clayton to Duboce Tunnel

2,852' double track.

Stanyan St. to Carl to Parnassus to Judah St. to 9th Ave. to Pacheco.

8,460' double track.

9th Ave. at Pacheco St.

113' single track.

E.V.H.
2-16-45

6. (Trolley Coach) Cont'd.
Trolley Coach Overhead

Haight St. - Market to Masonic to Frederick to Clayton to Carl to Stanyan to Parnassus to Judah to 9th Ave. to Ortega

18,495' no trolley poles required
Double run.

9th Ave. - Ortega to Pacheco

680' no trolley poles required.
Single run.

9th and Pacheco to 10th Ave. to Ortega to 9th Ave.

1,300' trolley poles required.
Single run

21. (Trolley Coach)

Same route as at present with Loop at outer end.

Track Removal: Hayes St. - Market to Stanyan to Fulton

11,974' double track.

8th Ave. - Fulton to Clement

3,512' double track.

Trolley Coach Overhead

Bay Bridge Terminal Loop

1,982' no trolley poles required.
Single run

Hayes St. Market to Stanyan to Fulton

11,974' no trolley poles required.
Double run.

8th Ave. - Fulton to Geary St.

2,745' no trolley poles required.
Double run.

E.V.H.
2-16-45

[illegible]

[illegible]

[illegible]

21. (Trolley Coach) Cont'd.

Geary St. - 8th to 9th Aves.

310' no trolley poles required.
Single run.

9th Ave. - Geary to Clement

700' trolley poles required.
Single run.

8th Ave. - Geary to Clement

700' no trolley poles required.
Single run.

31. (Trolley Coach)

Ferry Loop - Market to Eddy to Divisadero to Turk to Arguello to Balboa to 45th to Cabrillo to Great Highway.

Return - Cabrillo, 45th Ave. Balboa, Arguello Blvd., Turk St., Market St., to Ferry Loop.

Track Removal: Eddy St., - Market to Mason

558' double track.

Eddy St., Mason to Divisadero

8,800' single track.

Mason St. - Turk to Eddy.

311' single track.

Turk St., Mason to Divisadero

8,732' single track

Turk St., Divisadero to Arguello Blvd.
Arguello Blvd., Turk to Balboa, Balboa,
Arguello Blvd., to 30th Ave.

14,870' double track.

Balboa St. at 30th Ave.

218' single track

33rd Ave. - Geary to Balboa St.

700' double track.

E.V.H.
2-16-45

[illegible]

[illegible]

[illegible]

31. (Trolley Coach) Cont'd.

Balboa St., 33rd Ave., to 45th Ave.

3,720' double track.

45th Ave. - Balboa St. to Cabrillo St.

700' double track

Cabrillo St. - 45th Ave. to La Playa

1,240' double track.

Cabrillo St. (Loop) La Playa to Great Hiway

752' single track.

Trolley Coach Overhead

Eddy St. - Market St. to Divisadero

9,351' no trolley poles required.
Single run.

Turk St. - Market St. to Divisadero St.

8,852' no trolley poles required
Single run.

Divisadero St. Turk St. to Eddy St.

344' no trolley poles required.
Single run.

Turk St., Divisadero to Arguello,
Arguello Blvd., Turk to Balboa,
Balboa - Arguello Blvd. to 31st Ave.

15,186' no trolley poles required.
Double run.

Balboa St. - 31st to 33rd Aves.

655' trolley poles required.
Double run.

Balboa St., 33rd Ave. to 45th Ave.

3,720' no trolley poles required.
Double run.

E.V.H.
2-16-45

[illegible]

[illegible] Dr. John Lewis in 1858 was.

[illegible] Lewis.

[illegible] - [illegible] in [illegible] Dr.

[illegible] Lewis.

[illegible] Dr. - John Lewis, on the [illegible]

[illegible] Lewis.

[illegible] Dr. Lewis to [illegible] Street

[illegible] Lewis.

[illegible]

[illegible] Dr. - Lewis [illegible] Dr. [illegible]

[illegible] Lewis.

[illegible] Dr. [illegible] Dr. [illegible]

[illegible] Lewis.

[illegible] Dr. [illegible]

[illegible] Lewis.

[illegible] Dr. [illegible]

[illegible] Lewis.

[illegible] Dr. [illegible] Dr. [illegible]
[illegible] Dr. [illegible] Dr. [illegible]
[illegible] - [illegible] Dr. [illegible] Alex.

[illegible] Lewis.

[illegible] Dr. - [illegible] to [illegible] Alex.

[illegible] Lewis.

[illegible] Dr. [illegible] Dr. [illegible]

[illegible] Lewis.

[illegible]
[illegible]

31. (Trolley Coach) Cont'd.

45th Ave. - Balboa to Cabrillo

700' no trolley poles required.
Double run.

Cabrillo St. - 45th Ave. to La Playa

1,240' no trolley poles required.
Double run.

Cabrillo St. Loop - LaPlaya to Great Highway.

561' no trolley poles required.
Single run.

PART II

(a) It is recommended that the following street car lines be continued in the postwar period on account of the density of travel on these lines.

Line	Route
14M	Mission Street (Daly City)
12M	Mission Street (Geneva Avenue)
"H"	Van Ness Avenue
"F"	Stockton Street

It is assumed that in the near future the "H" line will have been extended across Army Street and tied in with the #25M line tracks on Bayshore Boulevard and San Bruno Avenue, the southern terminal being San Bruno Avenue and Arleta Avenue (near County line). In the postwar period it is believed this extended route will be a very important line, because of potential residential and industrial development in the southern part of the City.

It is further assumed that in the near future the "F" line will be extended across Market Street to Fourth Street thereby tying in with the #20M line tracks to the Southern Pacific Depot at 3rd and Townsend Streets.

Part II

(a) It is recommended that the following street lines be confirmed in the manner shown on the drawing at Appendix "A" (Map 1):-

Line	Street
1st	Alandale Street (Lady Grey)
2nd	Mission Street (Jubilee Street)
3rd	The Esplanade
4th	Sea-side Line

It is intended that the Sea-side Line (the 4th line) will have open up, and street access made available to with the 2nd line which is intended eventually and for some branch the adjoining District (Lady Grey) Jubilee Street, Alandale (Lady Grey) Street. In the meantime it is believed that a footpath will be sufficient for local business or personal convenience by Municipal Authorities in the adjoining part of the City.

It is therefore recommended that in the meantime the 4th line will be reserved under Public Street in order to avoid the 2nd line which is the Mission Street Jubilee Street or 3rd and Municipal Authorities

Electric car requirements of the "H" and "F" lines in the immediate postwar period hereinafter shown are for the extended or enlarged routes.

Electric car requirements for the #12M line cover requirements after change to be made on April 8, 1945.

It should also be pointed out that on April 8, 1945 the #12M Ingleside and Ocean line will cease operation as such, and instead will operate on Mission Street only from the Ferry Building to Geneva Avenue. A maximum of 7 cars will be operated during the peak hours.

All electric cars now operated on the above lines are old and obsolete in design. By the time that the war ends and new equipment is again available, they should be replaced with modern street cars of the President's Conference type, modified for 2-man operation; and further for operation in tandem or train formation.

The number of cars needed to fill maximum schedule requirements in the immediate postwar period is herewith given.

For comparative purposes, the maximum number of cars operated at present, also maximum number of cars operated in 1941 (immediate prewar) is shown.

Electrical and Instrument Work "B" on "B" Lines is the installing power wires, control instruments, room and for the attached or integral one.

Electrical and Instrument Work "C" on "C" Lines is the same as "B" Lines in Part 1.

It should also be obvious, of course, that Work "B" Lines the site facilities and Work "C" Lines will depend entirely on each, and instead will consist of flexible connections only from the "B" facilities to "C" Lines. A minimum of 7 days will be required after the "B" Work.

All electric wire has been run on the above lines and ready for connection to fixtures. In the case of the "B" Lines the work has been completed in a very efficient, neat manner to satisfy with minimum effort and in the Electrical Contractor's opinion, no fault for 2-week completion has resulted in terms of work in progress.

The number of men employed on this section varied considerably in the beginning period, however in general, 4 men.

For comparison purposes, the attached table of man-days expended in electrical, its actual number of man days expended in 1961 Installation work, is given.

Line	Number of Cars Needed Immediate Postwar	Number of Cars Operated Now	Number of Cars Operated 1941
14M	30	34	30
12M	7	7	12
"H"	29	21	21
"F"	26	20	16
TOTAL	92	82	79

The above tabulation shows that 92 President's Conference electric street cars of modified type will be required to fill maximum schedule requirements as estimated or forecast in the immediate postwar period.

In addition, 9 cars will be required as proper provision for spare cars.

In that the Municipal Railway now own and operate 5 relatively new street cars of the President's Conference type and these do not need replacement, they may be used as spare cars, reducing the purchase of new cars for "spares" to 4.

Total number of new electric street cars necessary to purchase for the above lines will therefore be 96.

(b) It is recommended that the following combination street car and motor coach lines be converted to trolley coach lines, or combination trolley and motor coach lines as hereinafter indicated.

#15M Third-Kearny Street Line

It is recommended that this line, now combination street car and bus line, be changed to trolley coach and motor coach as follows:

(1) #15A Trolley Coach Line - to operate from North Beach to Visitacion Valley as follows:

From North Point and Powell Street via Powell, Broadway, Kearny, Third, Bayshore, Visitacion, Hahn, Sunnydale, Santos, Geneva, Mission, Amazon, London, Geneva, returning via same route. Loop at north end of line to be Powell, Bay, Mason, North Point, Powell.

(2) #15B Motor Coach Line- to operate over same route described above. Motor coaches will provide express service to Bay View and Visitacion Valley as follows:

Southbound and northbound coaches to operate nonstop from Mission Street to Oakdale Avenue -- all other portions of the line to be local operation.

#19M Polk-Larkin-9th Street Line

It is recommended that this line, now combination street car and motor coach line, be changed to trolley coach line operating over the following route:

From Fisherman's Wharf via Jefferson and Taylor, Beach, Larkin, North Point, Polk, Post, Larkin, across Market Street, 9th, Brannan, 3rd, Townsend, Fourth to Brannan, returning via same route.

#25M San Bruno Line

This line is presently operated with street cars during the daytime, and motor coaches at night, Sundays and Holidays.

The present routing is from 5th and Jessie Street to San Bruno and Arleta Avenue.

Alternate motor coaches operate to Geneva Avenue and Mission Street.

When the "H" line is extended from Army and Potrero over tracks of the #25M line to San Bruno and Arleta Avenue, the outer terminal of the #25M line will be Army and Potrero.

I recommend that this line be converted to a trolley coach line, route to be as follows:

From Army and Potrero via Army, Bryant, 6th, Mission, 4th, Howard, 6th, Bryant, to Army.

(c) I recommend that the following existing motor coach line be converted to a trolley coach line.

#24M Castro-Divisadero-Fillmore Line

This line, now a coach line, should be converted to a trolley coach line, operating over present route.

#26M Guerrero and Daly City Line

I recommend that this line, now a coach line, be converted to a trolley coach and motor coach line, operating over present route from Market and Valencia Street to Hillcrest and San Jose Avenue, Daly City.

The motor coaches should operate express or non-stop between Guerrero and San Jose Avenue (29th Street) and 14th Street.

(d) I recommend that the following existing street car line be converted to a trolley coach line.

#22M Fillmore Street Line

This line is presently operating from 18th and Third Street to Fillmore and Broadway.

It is recommended that trolley coaches be operated over this route.

(e) I recommend that the following existing street car line be converted to a motor coach line:

#41M S.P. Depot - 2nd and Market Streets

Street cars are presently operated on this line during morning and evening rush hours on weekdays and Saturdays. No off-peak or Sunday and Holiday service is offered.

I recommend that this line be abandoned as a street car line and that motor coaches be operated in place of street cars.

It is suggested that the following routing be employed:

From 2nd and Market Street, via Market, 1st, Mission, 2nd, Brannan, 3rd, Townsend, 4th, Brannan, returning via above route.

The number of electric trolley coaches and coaches needed to fill maximum schedule requirements in the immediate postwar period is herewith given.

For comparative purposes, the maximum number of cars and coaches operated at present, also maximum number of cars and coaches operated in 1941 (immediate prewar) is shown.

	Immediate Postwar		Present Schedules		1941 Schedules	
LINE	No. of Trolley Coaches Needed	Number of Coaches Needed	Number of Street Cars	Number of Coaches	Number of Street Cars	Number of Coaches
15M	25	15	13	29	45*	29**
19M	15	--	4	8	1	12
25M	6	--	10	4***	2	12
24M	9	--	--	10	--	9
26M	8	4	--	13	--	12
22M	24	--	28	--	24	--
41M****	--	12	8	--	Note*	--
TOTAL	87	31	63	64	72	74

*Included 12 electric cars operated on Sansome St. as Number 29 Line. Schedules of Number 15, 16, 29, 41 lines written on 1 table in 1941.

**In June 1941, 29 coaches substituted for street cars. 15 street cars operated only during peaks.

***P.M. only weekdays and Saturdays. 5 coaches day and night on Sundays.

****A.M. and P.M. peaks only.

Above tabulation shows that 87 electric trolley coaches and 31 motor coaches will be required to fill maximum schedule requirements as estimated or forecast in the immediate postwar period.

In addition, 9 electric trolley coaches and 3 motor coaches will be required for proper provision of spare vehicles.

Total number of vehicles required for above lines is therefore 96 electric trolley coaches and 34 motor coaches.

ESTIMATED COST OF PART II

The estimated cost of rolling stock, track rehabilitation or removal, paving, also rehabilitation of overhead plant is herewith given.

96 Electric cars, President's Conference Type modified, double end, multiple unit operation, 50' 10" @ $27,300.00 each, including freight and California Use Tax.....	$2,620,800.00
96 Electric Trolley Coaches, 44 passenger, @ $16,100.00 each, including freight and California Use Tax.....	1,545,600.00
34 Motor Coaches, 44 Passenger, @ $14,900.00 each, including freight and California Use Tax.....	506,600.00
Sub-total, Rolling Stock	$4,673,000.00
Track work and paving, removal of abandoned trackage and overhead plant.....	$2,398,860.00
Trolley Coach overhead construction for various routes.....	787,000.00
Sub-total, Track and Overhead Plant	$3,185,860.00
Conversion at car houses to handle trolley and motor coach storage.....	184,000.00
GRAND TOTAL: All projects of PART II	$8,042,860.00

In estimating the cost of track removal, the Power and Utilities Engineering Bureau assumed that in 1/3 of the mileage the entire track structure, including ties, will be removed; and that in 2/3 of the mileage the rails only will be removed, leaving the ties in place.

Were the ties removed from the entire mileage of track removed, the cost would be increased $353,424.00.

Detail of all work to be performed on projects under Part II is herewith given.

	Quantity	Unit Price	Amount
Remove girder rail construction in paved streets and repave single track	8.88 mi.S.T.	$33,500	$297,480.*
Remove rails only in paved streets and repave rail trenches	17.76 mi.S.T.	13,600	241,536.*
Reconstruct tracks as below:	17.8 mi.S.T.	97,500	1,735,500.

Mission Street		
Co.Line to 26th	7.2	mi.S.T.
16th to 5th	2.8	" "
Stockton Street		
Market to Green	1.9	" "
Fourth Street	1.8	" "
Townsend Street	0.3	" "
San Bruno Avenue	3.8	" "
Total	17.8	

(Continued next page)

New - connecting Stockton Street to 4th Street	$30,000.
Connection, Potrero Avenue to Bay Shore and move turnout to Bay Shore and Arleta Ave.	27,000.
New special work for Townsend Terminal	20,000.
Crossover, 4th Street near Howard Street	5,000.
Connecting curve, 4th and Mission Street	14,000.
Rearranged Mission Terminal at Embarcadero	20,000.
Removing trolley poles and wire 2.69 lin. mi. @ $3,000	8,070.
TOTAL	$2,398,860.
Trolley coach overhead construction	787,000.
Car house conversion for trolley coaches	164,000.
" " " " motor "	20,000.
TOTAL	$3,369,860.

*NOTE: These items are estimated on the assumption that in 1/3 of the mileage, the entire track structure, including ties will be removed; and that in 2/3 of the mileage the rails only will be removed leaving the ties in place. If the ties are removed from the entire mileage the cost will be increased by $353,424.

L.V.D.
3-19-45

15 3rd-Kearny (Trolley Coach)

From Powell and Bay via Bay, Mason, North Point, Powell, Broadway, Kearny, 3rd, Bayshore, Visitacion, Hahn, Sunnydale, Santos, Geneva, Mission, Amazon, London to Geneva.

Track Removal

Powell St., North Point to Broadway, Broadway, Mason to Embarcadero, Embarcadero, Broadway to Ferry Loop, Kearny, Broadway to Market; 3rd St., Market to Mariposa; Mariposa, 3rd St. to Illinois.

22,661.7' Double Track
864.5' Single Track

Trolley Coach Overhead

Powell and Bay via Bay, Mason, North Point to Powell.

1,307' Trolley Poles required
Single Run.

Powell St., North Point to Bay.

344' No Trolley Poles required.
Single Run.

Powell St., Bay to Broadway; Broadway, Powell to Kearny

4,494' No Trolley Poles required
Double Run

Kearny St., Broadway to Market, 3rd St., Market to North end of Viaduct

11,865' No Trolley Poles required.
Double Run.

3rd St., North end Viaduct to Bayshore Blvd.

19,569' Trolley Poles required
Double Run.

Bayshore Blvd., 3rd St. to Visitacion Ave.

3,375' Trolley Poles required.
Double Run.

L.V.D.
3-19-45

PART II
19 Polk-Larkin (Trolley Coach)

From Beach and Hyde via Hyde, Jefferson, Taylor, Beach, Polk, Post, Larkin, 9th, Brannan, 3rd, Townsend, 4th to Brannan and return over Brannan to 9th, etc.

Track Removal

Polk St., North Point St. to Post St. to Larkin St. to Market St.

10,703' Double Track

Trolley Coach Overhead

Hyde, Beach to Jefferson to Taylor to Beach to Hyde.

3,756' Trolley Poles required. Single run.

Beach St., Hyde to Polk, Polk St., Beach to North Point St.

970' Trolley Poles required Double run.

Polk St., North Point to Post St. to Larkin St. to Market St.

10,703' No Trolley Poles required. Double Run.

9th St. Market to Brannan, Brannan St., 9th St. to 4th St.

8,144' Trolley Poles required. Double Run.

Brannan St. 4th to 3rd St.

907' Trolley Poles required Single Run

Townsend St., 3rd to 4th, 4th St. Townsend to Brannan.

1,540' No Trolley Poles required. Single Run.

L.V.D.
3-19-45

15 3rd-Kearny (Trolley Coach) Cont'd.

Visitacion and Bayshore via Visitacion, Hahn, Sunnydale, Santos, Geneva to London.

12,847' Trolley Poles required.
Double Run.

Geneva, London to Mission

268' Trolley Poles required.
Single Run.

Mission, Geneva to Amazon.

360' No trolley poles required.
Single run.

Amazon, Mission to London; London, Amazon to Geneva.

639' Trolley Poles required.
Single Run.

41 S.P. Depot, 2nd and Market (Motor Coach)

Track Removal — Brannan St., 3rd to 2nd St., 2nd St., Brannan to Mission St.

4,108' Double Track

42 Sansome (Motor Coach)

Track Removal — Bush St., Kearny to Sansome, Sansome St., Bush St. to Embarcadero.

5,880' Double Track
142' Single Track

25 (Trolley Coach)

Andrew and Army via Army, Bryant, 6th, Mission, 4th, Howard to 6th.

Track Removal — Potrero and Army via Army, Bryant, 6th to Mission St.

14,692' Double Track

L.V.D.
3-19-45

[illegible]

[illegible]

[illegible]

25 (Trolley Coach) Cont'd.

Trolley Coach Overhead

Loop Andrew, Army and Potrero

400' No Trolley poles required.
Single Run

Potrero and Army via Army, Bryant, 6th St. to Mission

14,692' No Trolley Poles required
Double Run.

Mission and 6th via Mission, 4th to Howard St.

2,448' No Trolley Poles required.
Single Run.

24 (Trolley Coach) Over present route.

Trolley Coach Overhead

Fillmore and Marina Blvd. to Fillmore and Union.

3,400' Trolley Poles required.
Double Run.

Fillmore and Union to Fillmore and Green

344' Trolley Poles required.
Single Run.

Green St. Fillmore to Steiner

481' Trolley Poles required.
Single Run.

Steiner St., Union to Green

344' Trolley Poles Required.
Single Run.

Steiner St., Green to Broadway

704' Trolley Poles required.
Double Run.

L.V.D.
3-19-45

[illegible] Tunnel Portal:

Twelve Tunnel Sections

[illegible] Section, [illegible] and Stations

[illegible] to Twelve Point Section [illegible]
[illegible]

[illegible] and Area at [illegible] Street,
[illegible] to [illegible]

[illegible] to Twelve Point Section [illegible]
[illegible]

[illegible] and [illegible], and to
[illegible]

[illegible] to Twelve Point Section [illegible]
[illegible]

[illegible] [illegible] [illegible]

Twelve Point [illegible]

[illegible] and [illegible] Street to [illegible]
[illegible]

[illegible] Twelve Point [illegible]
[illegible]

[illegible] and [illegible] to [illegible] and [illegible]

[illegible] Twelve Point [illegible]
[illegible]

[illegible] [illegible] to [illegible]

[illegible] Twelve Point [illegible]
[illegible]

[illegible] Street to [illegible]

[illegible] Twelve Point [illegible]
[illegible]

[illegible] [illegible] to [illegible]

[illegible] Twelve Point [illegible]
[illegible]

[illegible]
[illegible]

24 (Trolley Coach) Cont'd.

Broadway, Steiner to Fillmore

481' Trolley Poles required
Double Run.

Fillmore St., Broadway to Jackson

672' No Trolley Poles required.
Double Run.

Jackson St., Fillmore to Divisadero

1,934' No Trolley Poles required.
Double Run.

Divisadero St., Jackson to Sacramento

989' Trolley Poles required
Double Run

Divisadero St., Sacramento to Page

6,146' No Trolley Poles required
Double Run.

Divisadero and Page via Divisadero,
Castro to Duboce

1,247' Trolley Poles required.
Double Run.

Castro and Duboce to Castro and Market

2,400' Trolley Poles required.
Double Run.

Castro and Market to Castro and 18th

616' No Trolley Poles required
Double Run.

Castro and 18th to Castro and Clipper

4,418' Trolley Poles required
Double Run.

Castro and Clipper via Castro, 26th,
Noe Clipper to Castro

1,869' Trolley Poles required.
Single Run.

26 Guerrero St. (Trolley Coach)

Over present route from Market and Valencia to Hillcrest and San Jose Ave., Daly City.

Trolley Coach Overhead

McCoppin and Valencia via Valencia, Market, 12th, Otis to McCoppin

2,354' No Trolley Poles required
Single Run

McCoppin, Otis to Valencia

690' Trolley Poles required
Single Run

Valencia, McCoppin to 14th St.

1,190' No Trolley Poles required.
Double Run

14th and Valencia via 14th, Guerrero, San Jose Ave., 30th, Chenery, Diamond to Monterey Blvd.

16,090' Trolley Poles required.
Double Run

Monterey Blvd. and San Jose Ave. to San Jose Ave. and Ocean Ave.

4,280' No Trolley Poles required.
Double Run

San Jose Ave. and Ocean Ave. to San Jose Ave. and Hillcrest, Daly City

7,847' No Trolley Poles required
Double Run

Track Removal — San Jose Ave., Monterey Blvd., to Ocean Av.

4,546' Double Track

22 Fillmore St. (Trolley Coach)

Track Removal — Fillmore St., Broadway to Jackson

608' Double Track.

L.V.D.
3-19-45

22 Fillmore St. (Trolley Coach) Cont'd.

16th St., Potrero to Kansas to 17th to Connecticut, to 18th to 3rd St.

6,630' Double Track

Trolley Coach Overhead

Fillmore and Jackson St., via Fillmore, Duboce, Church, 16th St., Kansas, 17th, Connecticut, 18th St. to 3rd St.

23,235' No Trolley Poles required. Double Run.

19th St., 3rd to Tennessee, Tennessee, 19th to 18th St.

746' Trolley Poles required Single run.

L.V.D.
3-19-45

PART II

RECAPITULATION OF ESTIMATED COST

OF TROLLEY COACH OVERHEAD CONSTRUCTION BY ROUTES

POSTWAR CONVERSION

Route 19	Polk, Larkin, 9th St. & Brannan	$105,000.
Route 15	3rd St., Kearny, Bayshore, & Geneva	283,000.
Route 25	6th St., Bryant & Army	48,000.
Route 24	Fillmore, Jackson, Divisadero & Castro	133,000.
Route 26	Valencia, Guerrero, Chenery & San Jose	152,000.
Route 22	Fillmore, Church, 16th St.	66,000.
	TOTAL	$787,000.

Storage and Service Facilities for Trolley Buses (Conversion of Present Property)	$164,000.
Storage and Service Facilities for Motor Coaches. (Conversion of Present Property)	20,000.
TOTAL	$184,000.

ABOVE ROUTED PER PART II AS LISTED BY E.V.H. 3-12-45

W.C.E.
3-28-45

ESTIMATED COST OF

TROLLEY COACH OVERHEAD CONSTRUCTION

Route 19	Polk, Larkin, 9th, Brannan	
	Hyde St., Beach to Jefferson, Taylor, Beach to Hyde. Poles required. 1-Way Bracket Construction .68 Mi. @ $24,900	$ 16,932.
	From Beach & Hyde to Polk to North Point. Poles required. 2-Way Span Construction. .25 Mi. @ $33,500	8,375.
	From Polk & North Point to Post, Larkin, Market. Poles existing. 2-Way Span Construction. 2.03 Mi. @ $14,200	28,826.
	9th St., Market to Bryant. Poles required on east side of St., existing on west side. 2-Way Span Construction. .60 Mi. @ $20,900	12,540.
	9th St., Bryant to Brannan Brannan St., 9th to 4th Poles required. 2-Way Span Construction .94 Mi. @ $33,500	31,490.
	Brannan St., 4th St. to 3rd. Poles required. 1-Way bracket Const. .17 Mi. @ $24,900	4,233.
	4th St., Brannan to Townsend. Townsend St., 4th St. to 3rd. Poles existing. 1-Way Span Const. .29 Mi. @ $8,250	2,393.
	TOTAL	$104,789.

W.C.E.
3-28-45

ESTIMATED COST OF

TROLLEY COACH OVERHEAD CONSTRUCTION

Route 15	3rd, Kearny, Bay Shore - Geneva	
	Powell & Bay via Bay, Mason, North Point to Powell. Poles required. 1-Way Bracket Const. .25 Mi. @ $24,900	$ 6,225.
	Powell St., North Point to Bay Poles existing. 1-Way Span Const. .07 Mi. @ $8,250	578.
	Powell & Bay via Powell, Broadway Kearny, 3rd to North end of Viaduct. Poles existing. 2-Way Span Const. 3.10 Mi. @ $14,200	44,020.
	3rd St., & North end Viaduct via 3rd, Bay Shore Blvd., Visitacion Ave., Hahn, Sunnydale, Santos, Geneva to London. Poles required. 2-Way Span Construction. 6.77 Mi. @ $33,500	226,795.
	Geneva & Mission via Geneva, London, Amazon to Mission. Poles required. 1-Way Bracket Const. .17 Mi. @ $24,900	4,233.
	Mission St., Geneva to Amazon. Poles existing. 1-Way Span Const. .07 Mi. @ $8,250.	578.
	TOTAL	$282,429.

W.C.E.
3-28-45

ESTIMATED COST OF

TROLLEY COACH OVERHEAD CONSTRUCTION

Route 25	Sixth, Bryant, Army	
	6th & Howard via 6th, Mission, 4th to Howard. Poles existing. 1-Way Span Construction .58 Mi. @ $8,250	$ 4,785.
	6th & Howard via 6th, Bryant, Army to Andrew St. Poles existing. 2-Way Span Const. 2.48 Mi. @ $14,200	35,216.
	Loop at Army & Andrew Sts. Poles required.	7,750.
	TOTAL	$47,751.

W.C.E.
3-28-45

ESTIMATED COST OF

TROLLEY COACH OVERHEAD CONSTRUCTION

Route 24	Fillmore, Jackson, Divisadero Castro	
	Fillmore St., Marina Blvd., to Union. Poles required. 2-Way Span Const. .64 Mi. @ $33,500	$ 21,440.
	Fillmore & Union via Fillmore, Green, Steiner, Union. Poles required. 1-Way Bracket Const. .22 Mi. @ $24,900	5,478.
	Steiner St., Green to Broadway. Broadway, Steiner to Fillmore. Poles required. 2-Way Span Const. .22 Mi. @ $33,500	7,370.
	Fillmore St., Broadway to Jackson. Jackson St., Fillmore to Divisadero. Poles existing. 2-Way Span Const. .5 Mi. @ $14,200	7,100.
	Divisadero St., Jackson to Sacramento. Poles required. 2-Way Span Construction. .19 Mi. @ $33,500	6,365
	Divisadero St., Sacramento to Page Poles existing. 2-Way Span Const. 1.16 Mi. @ $14,200	16,472.
	Divisadero & Page via Divisadero, Castro to Market. Poles required. 2-Way Span Const. .69 Mi. @ $33,500	23,115.
	Castro St., Market to 18th St. Poles existing. 2-Way Span Const. .12 Mi. @ $14,200	1,704.
	Castro St., 18th St. to Clipper Poles required. 2-Way Span Const. .83 Mi. @ $33,500	27,805.
	Castro & Clipper via Castro, 26th, Noe, Clipper to Castro. Poles req'd. 1-Way Bracket Const. .35 Mi. @ $24,900	8,715.
	Loop. Fillmore & Marina Blvd. Poles required.	7,750.
	TOTAL	$133,314

W.C.E.
3-28-45

[illegible]

ESTIMATED COST OF

TROLLEY COACH OVERHEAD CONSTRUCTION

Route 26.	Valencia, Guerrero, Chenery, San Jose	
	12th & Market via 12th, Otis to McCoppin. Valencia St. from McCoppin to Market. Poles existing. 1-Way Span Const. .35 Mi. @ $8,250	$ 2,888.
	McCoppin, Valencia to Otis. Poles required. 1-Way Bracket Const. .13 Mi. @ $24,900	3,237.
	Valencia, McCoppin to 14th. Poles existing. 2-Way Span Const. .23 Mi. @ $14,200	3,266.
	14th & Valencia via 14th, Guerrero, San Jose, 30th, Chenery, Diamond to Monterey Blvd. Poles required. 2-Way Span Const. 3.05 Mi.@ $33,500	102,175.
	Monterey & San Jose via San Jose to Hillcrest in Daly City. Poles existing. 2-Way Span Construction 2.30 Mi. @ $14,200	32,660.
	Daly City Loop. Poles Required	7,750.
	TOTAL	$151,976.

W.C.E.
3-28-45

ESTIMATED COST OF

TROLLEY COACH OVERHEAD CONSTRUCTION

Route 22	Fillmore, Church, 16th St.	
	Fillmore & Jackson via Fillmore, Duboce, Church, 16th, Kansas, 17th, Connecticut, 18th to Tennessee. Poles existing. 2-Way Span Construction. 4.37 Mi. @ $14,200	$62,054.
	19th St., 3rd to Tennessee. Tennessee St., 19th to 18th. Poles required. 1-Way Bracket Construction. .14 Mi. @ $24,900	3,486.
	18th St., Tennessee to 3rd St. Poles existing. 1-Way Span Construction. .06 Mi. @ $8,250	495.
	TOTAL	$66,035.

W.C.E.
3-28-45

PART III

Existing street car lines on which no recommendations have been made in Parts I or II of this report are treated herewith.

"E" Union Street Line

The Public Utilities Commission has approved the conversion of this street car line to a trolley coach line. On February 20, 1945, the Power and Utilities Engineering Bureau was instructed by Mr. Cahill to prepare plans and specifications for the overhead work required.

Approval has been requested of the Office of Defense Transportation covering the purchase of 16 trolley coaches.

With respect to routing of the "E" line, the Consulting Engineer recommended the following to Mr. E. G. Cahill on March 1, 1945.

(a) "That coaches be routed over the present "E" line route, namely, via Jackson and Washington Streets between Columbus Avenue and the Embarcadero.

"If this recommendation is adopted and the coaches are to be garaged at the Potrero barn, overhead plant will have to be installed on Kearny Street from Columbus Avenue to Market Street, across Market Street to 3rd Street, and on 3rd Street to Howard Street. This is a distance of

approximately 4650 feet and the overhead construction would cost approximately $13,200.

"An alternative would be to lease suitable storage facilities for the trolley coaches along the proposed trolley coach line."

If this recommendation is not approved, then I recommend the following as second choice:

"Inner terminal of the proposed trolley coach line to be the Bay Bridge Terminal. Proposed routing of the inner portion of the route to be as follows:

Beginning at Union Street and Columbus Avenue, via Columbus Avenue to Jackson Street, to Battery Street, across Market Street to First Street, to Howard Street, to Fremont Street, across Market Street to Front Street, to Pine Street, to Sansome Street, to Washington Street, to Columbus Avenue, to Union Street."

"As shown in my letter of January 9, 1945, the riding on Washington Street and Jackson Street between the Embarcadero and Columbus Avenue is quite heavy. If the trolley coach line is routed to the East Bay Terminal Building, I then suggest that a shuttle coach be operated between Columbus Avenue and the Embarcadero as follows:

Beginning at Columbus Avenue and Jackson Street, via Jackson Street, to Embarcadero, to

Washington Street, to Columbus Avenue."

As a third choice, the writer suggested the following on March 1, 1945:

"That the proposed line be routed as follows:

Beginning at Columbus Avenue and Jackson Street, via Jackson Street to Battery Street, to California Street, to Davis Street, across Market Street to Beale Street, to Howard Street, to Main Street, to Drumm Street, to California Street, to Sansome Street, to Washington Street, to Columbus Avenue."

#9M Valencia Street Line

It is recommended that after the war this line be abandoned. It should be noted that it is one block from Mission Street where excellent street car service will be provided, and one block from Guerrero Street where trolley coach service is recommended.

#11M Mission and 24th Street Line

It is recommended that after the war this line be abandoned. It is suggested that a motor coach line be operated over the following route:

From Hoffman Avenue and 24th Street, via 24th Street to Kansas Street, to 26th Street, to Vermont Street, to Army Street, to 3rd Street,

to Evans Avenue, to Army Street, to Vermont Street, to 26th Street, to Kansas Street, to 24th Street, to Hoffman Avenue.

This proposed coach line will afford the residents along and adjacent to 24th Street from Twin Peaks through the Mission and Potrero Districts direct transportation to 3rd Street. It will also furnish good transportation to these people to the City and County Hospital on Potrero Avenue, 24th street being one block from same.

Six motor coaches will be required for this line. Provision for these coaches is contained in Part IV of this report. See #6 and #35 M lines.

If this recommendation is approved, then the #6 and #35 M coach lines should be revised or changed as recommended in Part IV of this report.

#12M Ingleside and Ocean Line

On April 8, 1945, the operation of the #12M Ingleside and Ocean line as such, will be discontinued.

The following service will be provided on the various portions of the line:

Sloat Boulevard from St. Francis Circle to Fleishhacker Pool by two motor coaches. At night, coach service will be operated from Fleishhacker Pool to Fort Funston Gate, the same as has been done since early 1942. Coaches are available for this operation.

The coach service herewith outlined was approved by the Office of Defense Transportation.

See #12M Mission Street electric street car line Part II.

Ocean Avenue - Onondaga Avenue from Brighton Avenue to Mission Street. Alternate cars of the "K" line will be operated over Ocean Avenue from Brighton Avenue to Onondaga Avenue and on Onondaga Avenue to Mission Street.

#20M Ellis and O'Farrell Line

It is recommended that this line be abandoned.

That portion of the route on 4th Street from Market Street to the S.P. Depot at 3rd and Townsend Street will be served by the "F" Stockton Street line extended as proposed in Part II ("F" Stockton Street).

Patrons of the #20M line now using the service on Ellis and O'Farrell Street can use the "B" and "C" Geary Street lines or the #31M line on Turk and Eddy Streets.

Patrons of the #20M line now using the service on Divisadero Street can use the #24M Castro - Divisadero - Fillmore coach line.

Patrons of the #20M line now using the service on Page and Oak Streets can use the #7M or #17M Haight Street lines or #21M Hayes Street line.

#27M Bryant Street Line

At the present time, 2 street cars are operated on this line during the morning and evening peak hours only, on week days as trippers. This service is augmented by 5 motor coaches operating day and night on 9 full runs. The motor coaches serve the S.P. Depot at 3rd and Townsend Streets, deviating in this respect from the route of the #27M line street cars.

On Saturdays and Sundays no street car service is operated. Five coaches are operated day and night on Saturday with 9 full runs. Three coaches are operated on Sunday with 4 full runs.

I recommend that street car operations on the #27M line be discontinued entirely as soon as possible.

If this is done, it will be necessary to augment the coach service by adding 4 coaches during the morning and evening rush hours on weekdays, making a total of 9 coaches operated on this line.

Coaches now owned and undergoing repairs could fill this requirement; hence no provision is made for purchase.

See 27M Bryant Motor Coach, Part IV.

#36M Folsom Street Line

At the present time, 4 street cars are operated on this line on weekdays and Saturdays with 7 full runs and 1

tripper. No street car service is operated on Sunday.

Sunday service is provided by 3 coaches operating on 6 full runs.

I recommend that this line be abandoned entirely. Patrons now using the #36M line can use the "R" line on Howard Street and Van Ness Avenue south, one block away; further provision already has been made by the Public Utilities Commission to add 2 more coaches to the "R" line so that ample service will be available.

Also service of the #33M line is available on Harrison Street, one block distant from Folsom Street between 3rd Street and 14th Street.

#17M Haight and Ingleside Line

On November 21, 1944, the Consulting Engineer recommended that the #17M line be terminated at 20th Avenue and Lincoln Way. The present outer terminal is 19th Avenue and Wawona Street.

This recommendation was made, in that with the modification of the #3 Park-Presidio-Mission coach route, service on 19th Avenue will be ample to care for those patrons of the #17M line now boarding or leaving cars on 20th Avenue.

Further, the condition of the tracks on 20th Avenue is exceedingly poor, and residents on that street have complained about noise and vibration emanating from passing street cars.

The Public Utilities Commission have approved this recommendation and same can be placed in effect as soon as the #3 Coach route is modified.

On April 2, 1945, the writer recommended that the #7M Haight and Ocean line be routed through the Duboce Tunnel by way of 20th Avenue and Judah Street, rather than by way of Frederick and Carl Streets.

If this recommendation is approved, then tracks on 20th Avenue may be abandoned from Judah Street to 19th Avenue, and on Wawona Street from 19th to 20th Avenues.

References: Recommendation 2 - #17M Haight-Ingleside Line, 11-21-44. Letter to Mr. E.G. Cahill re Recommendation 7 - Haight - Ocean Line, 4-2-45.

#40M San Mateo Interurban Line

It is recommended that electric street car operation be discontinued and that motor coaches be substituted for street cars on this line.

In arriving at this conclusion, full consideration has been given to the advisability of employing electric interurban trains, modified electric street cars and electric trolley coaches.

Electric train or street car operation will require complete rehabilitation of track, roadbed, culverts and overhead plant. Also the Millbrae Substation would require complete rehabilitation or renewal of converting equipment.

The Consulting Engineer does not believe that the necessary expenditure of $750,000 to $1,000,000 for such rehabilitation is economically sound.

Consideration has been given to the plan of paving the right of way, thereby providing a roadway 30 feet wide from Colma to Burlingame Avenue, Burlingame, and operating trackless trolleys thereon.

The cost of such a roadway, approximately 10 miles long, together with new overhead plant and rehabilitation of Millbrae Substation would be in excess of $1,000,000.

At the present time transportation of residents of the Peninsula between San Francisco and San Mateo and proints between, is provided by the Southern Pacific Company, Pacific Greyhound Company and Municipal Railway. Local and intercity transportation in San Mateo, Burlingame, Millbrae and San Bruno is furnished by San Mateo Transit Company.

The population of the Peninsula cities from the San Francisco County line on the north to Belmont on the south is 86,787. The writer forecasts an increase of 6,255 or 7.2% in the 5-year period December 31, 1944 to December 31, 1949.

I visualize that in the next 10 years we will have a closely built succession of towns and cities on the Peninsula from the San Francisco County line to Redwood City.

There is a need now for more intercity transporta-

tion in the area in question. The people prefer rubber borne vehicles, operating on frequent headways, to any other form of transportation.

I recommend, therefore, that the San Mateo interurban line be converted to a motor coach line and that two routes be established as follows:

(a) From the East Bay Terminal Building via Howard Street, South Van Ness Avenue, Army Street, Mission Street to Daly City, Colma, thence via El Camino Real to Tanforan, thence via California Drive and San Mateo Drive to San Mateo. Instead of terminating the line at the S.P. Depot, it is suggested that same terminate at 36th Avenue and El Camino Real, San Mateo.

(b) Route (a) as described above will necessarily be a slow route. To provide fast service to Burlingame and San Mateo, it is recommended that the route hereinafter described be inaugurated when the Bayshore Freeway is completed:

From East Bay Terminal Building via Howard Street, Third Street, Bayshore Freeway to Broadway, Burlingame; California Drive, San Mateo Drive, "B" Street, 4th Street, El Camino Real to 36th Avenue.

A maximum of 10 coaches will be required on each of the above proposed routes or 20 on both routes. Two coaches will be required for spares or 22 coaches for this operation.

ESTIMATED COST OF PART III

The estimated cost of rolling stock, track and overhead removal, paving, etc. is herewith given.

22 Motor Coaches, 44-Passenger,
@ $14,900.00 each, including
freight and California Use Tax.....$327,800.00

Track and overhead removal,
paving, etc.....$1,148,103.00

GRAND TOTAL - All Projects
PART III $1,475,903.00

Part III

	Quantity	Unit Price	Amount
Remove girder rail construction in paved track and repave single track.	10.29 mi. S.T.	$33,500	$344,715.*
Remove rails only in paved streets and repave rail trenches	24.33 mi. S.T.	13,600	330,888.*
Remove open tracks and overhead (Sloat Blvd.)(San Mateo Line)	18.95 mi. S.T.	5,000	94,750.
Remove trolley poles and wire	21.76 lin.mi.	3,000	65,280.
		TOTAL	$835,633.
REMOVAL OF MISCELLANEOUS TRACKS AND OVERHEAD CONSTRUCTION			
Electric tracks abandoned, single track	4.34 mi.S.T.	37,000	160,580.
Cable tracks abandoned, single track	3.97 mi.S.T.	37,000	146,890.
		TOTAL	$307,470.
REMOVAL OF ELECTRICAL EQUIPMENT FROM MILLBRAE SUBSTATION			5,000.
		TOTAL	$1,148,103.

*NOTE: These items are estimated on the assumption that in 1/3 of the mileage, the entire track structure, including ties will be removed; and that in 2/3 of the mileage the rails only will be removed leaving the ties in place. If the ties are removed from the entire mileage the cost will be increased by $409,343.

L.V.D.
3-19-45

Part III

No.9 Valencia St. (To be abandoned)

Track Removal 29th St., Mission to Noe

2,930' Double Track
104' Single Track

Cortland Ave., Mission to Banks

596' Double Track
2,340' Single Track

Richland Ave., Mission to Andover St.

199' Double Track
2,025' Single Track

Leese St., Mission to Richland

598' Single Track

No.11 - 24th St. (Motor Coach)

Track Removal 22nd St., Van Ness Ave. So. to Mission St.

560' Double Track

22nd St., Mission to Chattanooga St.

1,843' Double Track
361' Single Track

Dolores St., 22nd to 24th St., 24th St., Dolores to Chattanooga St.

1,619' Single Track

Chattanooga St., 22nd to 24th St.

1,264' Single Track

24th St., Chattanooga St. to Hoffman Ave.

4,011' Double Track
95' Single Track

L.V.D.
3-19-45

No.12 - Ingleside (Abandon Electric Cars.
(Run K to Onondaga & Mission)

Track Removal Sloat Blvd., St.Francis Circle to Great Highway

9,600' +- Double Track

(Open track construction. Remove track end leave R/W unpaved).

400' +- Double Track. (Paved Track)

No.17 - 20th Ave. (Terminate line at 20th Ave. & Lincoln Way)

Track Removal 20th Ave., Judah St. to Wawona, Wawona, 20th Ave. to 19th Ave.

8,944' Double Track

No.20 - Ellis - O'Farrell (Abandon)

Track Removal Ellis St., Market to Divisadero

2,815' Double Track
6,811' Single Track

Hyde St., Ellis to O'Farrell

437' Single Track

O'Farrell St., Hyde to Divisadero

6,700' Single Track

Divisadero St., Sacramento to Page

6,200' Double Track

Oak St., Fillmore to Stanyan

6,685' Single Track

Stanyan St., Oak to Haight

456' Single Track
334' Double Track

Page St., Stanyan to Divisadero

4,814' Double Track

Page St., Divisadero to Fillmore
1,976' Single Track

L.V.D.
3-19-45

No.27 - Bryant (Motor Coach)

Track Removal Bryant St., 2nd to 6th St.

3,674' Double Track

26th St., Bryant to Mission St.

2,769' Double Track

No.36 - Folsom (Abandon)

Track Removal Embarcadero, Mission to Howard

776' Double Track

Howard St., Embarcadero to Steuart St.

126' Double Track

Steuart St., Howard to Folsom

610' Double Track

Folsom St., Steuart to Precita Ave.

19,145' Double Track

Precita Ave., Folsom to Army St.

1,907' Single Track

L.V.D.
3-19-45

#40 San Mateo Interurban (Motor Coach)

Track Removal - From South San Francisco Junction to San Mateo

15.31 Miles Single Track, not paved, from South San Francisco Junction to Burlingame Avenue, Burlingame.	
Remove tracks and overhead	
15.31 miles @ $5,000 per mile	$ 76,550.00
3.76 Miles Single Track, paved, from Burlingame Avenue, Burlingame, to San Mateo	
Remove rails only and repair rail tranches	
3.76 miles @ $13,600	51,136.00
Remove overhead plant	
3.76 miles @ $3,000	11,280.00
Sub-total	$138,966.00
Removal of electrical equipment from Millbrae Sub-station	5,000.00
Total	$143,966.00

Estimate of Track and Overhead removal, etc. on #40 line prepared by L.V.N. using unit costs and mileage as furnished by E. Von Husen of Public Utilities Bureau of Engineering.

MISCELLANEOUS TRACK REMOVAL

Army Street - Potrero to Tennessee Street

4942' Double Track

18th Street - Castro to Mono

2731' Double Track
104' Single Track

Monterey Blvd. - Diamond to Genesee

1340' Double Track
3618' Single Track

Polk Street - Market to Hayes

253' Double Track

Washington Street - Kearny to Montgomery

346' Single Track

Presidio Avenue - Post to Sutter

315' Single Track

Clay Street - Larkin to Embarcadero

7098' Single Track - Cable

Larkin Street - Clay to Sacramento

218' Single Track - Cable

Sacramento Street - Fillmore to Embarcadero

4088' Double Track - Cable
5086' Single Track - Cable

Mason Street - Clay to Washington

371' Single Track - Cable

E.V.H.
3-12-45

PART IV

This section of the report deals with motor coach lines of the Municipal Railway system (Municipal and Market Divisions).

While Parts I, II and III of this report deal primarily with postwar plans, some of the recommendations made in Part IV can undoubtedly be made within the near future if desired.

#1 Park
#10M Glen Park

On November 9, 1944, the Consulting Engineer recommended that the #1 Park and #10M Glen Park coach lines be consolidated and operated over the following route:

From 29th and Mission Streets via Mission, 30th, Chenery, Diamond, Monterey, Plymouth, Yerba Buena, Miraloma, Portola, Laguna Honda Boulevard, 7th Avenue, Judah, 9th Avenue through Golden Gate Park, 10th Avenue to California Street. Loops at ends of line to be - Inner loop - 29th, San Jose, 30th, Mission Street. Outer loop - California Street, 11th Avenue, Clement Street, 10th Avenue.

Service to the San Francisco Junior College is now given by the #1 line coaches on all trips leaving California Street and 10th Avenue between 7:23 A.M. and 4:37 P.M.

If it is necessary to continue this service, which appears unwarranted, then I recommend that a shuttle bus be operated from the College via Phelan Avenue to Flood Avenue to Ridgewood Avenue to Monterey Boulevard.

This recommendation has been approved by the Public Utilities Commission, and can be placed in effect in the near future.

Reference: Recommendation 1 - Combination of #1 Park and #10M Glen Park Coach Lines - November 9, 1944.

#2 Irving-Noriega

On December 7, 1944, the Consulting Engineer recommended that the #2 Irving-Noriega coach line be extended as follows:

Outer terminal to be extended from Noriega Street and 35th Avenue to 48th Avenue.

Inner terminal to be Lincoln Way and 19th Avenue.

The extended route would therefore be as follows:

Beginning at 19th Avenue and Lincoln Way, via 19th Avenue to Irving Street, to 23rd Avenue, to Noriega Street, to 48th Avenue, to Moraga Street, to 47th Avenue, to Noriega Street, to 22nd Avenue, to Lincoln Way, to 19th Avenue.

The Public Utilities Commission have approved this recommendation; however approval has not as yet been granted by the Office of Defense Transportation.

Reference: Recommendation 3 - Irving-Noriega Coach Line - December 7, 1944.

#3 Park-Presidio-Mission

On November 21, 1944, the Consulting Engineer recommended that the #3 Park-Presidio-Mission coach line be revised or changed as follows:

Make the southern terminal of the line "Park Merced" (Metropolitan Life Insurance Company project).

The route of the #3 coach line would then be:

Beginning at 25th and Sea Cliff Avenues, via Sea Cliff Avenue, El Camino del Mar, 25th Avenue, Cross-over Drive (Golden Gate Park), 19th Avenue, Sloat Boulevard, Junipero Serra Boulevard, Font Boulevard, Park Merced Common, returning via same route.

It was also recommended that a new coach route be established to take the place of that portion of the present #3 coach line east of Junipero Serra Boulevard, namely:

Beginning at "Park Merced" - Park Merced Common, Font Boulevard, Junipero Serra Boulevard, Alemany Boulevard, Bayshore Boulevard, to Army Street and Potrero Avenue, returning via same route.

This recommendation has been approved by the Public Utilities Commission and the new service can be provided as soon as 4 coaches are available.

Reference: Recommendation 2 - #3 Bus Route - November 21, 1944.

#4 Embarcadero

Service on this line has recently been increased by adding 2 more coaches. It seems probable that due to increased activity on the waterfront, it may be necessary to add one more coach, making a total of 8 coaches operated during the peak periods or change of shifts.

#5 Marina

No change recommended at this time.

#6 Eureka-Diamond

It is recommended that this line operate from Market and Castro Streets to Diamond and Duncan Streets over the present route.

It is further recommended that bus operation of the #6 line be abandoned from 25th Street and Diamond Street to 23rd Street and South Van Ness Avenue as ample service will be provided by the motor coach line recommended to take the place of the #11 street car line on 24th Street beginning at Hoffman Avenue.

See Part III - #11 Mission and 24th Street Line.

#7 Miraloma

It is recommended that this route which now terminates at Melrose Avenue and Teresita Boulevard be extended via Melrose Avenue to Foerster Street to Monterey Boulevard so as to afford transfer privileges to combined #1-#10 coach routes.

#9 Bayshore Boulevard

It is recommended that when the "H" line is extended across Army Street and operated via Bayshore Boulevard and San Bruno Avenue to Arleta Avenue that the #9 coach line be abandoned.

On October 5, 1943, the Office of Defense Transportation in their "Report and Recommendations on San Fran-

cisc Transit" recommended abandonment of the #9 line stating as follows:

"Route 9, which for the most part runs over Bayshore Boulevard, duplicates street car service of the Market Street Railway Company and will be eliminated."

#11 Telegraph Hill

No change recommended at this time.

#14 Roosevelt Way

It is recommended that this coach line have its outer terminal at 17th and Clayton Streets. Outer loop which is suggested is 17th Street, Cole Street, Carmel Street, Clayton Street.

That portion of the #14 line now operating on Cole Street from 17th Street to Haight Street duplicates in large part service of the #33 Trolley Coach Line.

On October 5, 1943, the Office of Defense Transportation in their "Report and Recommendations on San Francisco Transit" recommended as follows:

"Route #14, Roosevelt Way, now runs from 14th and Market Streets around Buena Vista Park and continues up Cole Street to Haight Street. It will be terminated westbound at 17th and Clayton Streets. North of this point it duplicates trolley coach Route 33 of the Market Street Railway and is not needed."

#4 M Sutter and Sacramento Streets

This coach line operates nights only on weekdays and Saturdays, and day and night on Sundays and holidays, from Fillmore and Sutter Streets to 6th Avenue and Fulton Street.

No change recommended at this time.

#10 M Glen Park

It is recommended that this coach line be consolidated with the #1 Park line. (See #1 Park - Part IV)

#12 M Ingleside and Ocean

This coach line operates nights, Sundays and holidays from Onondaga and Mission Street to the Ocean Beach Terminal.

With the establishment of shuttle coach service on Sloat Boulevard from St. Francis Circle to Fleishhacker Pool; further with the extension of the "K" line to Mission Street, the #12 coach line will be abandoned entirely. The effective date for this change is April 8, 1945.

#15 M Third and Kearny Street

Service on the #15 M coach line should be increased to provide better service to the Bay View and Visitacion Valley districts.

When this is done, a further improvement should be made by operating alternate Bay View and Visitacion Valley

south bound coaches express or non-stop during the evening rush hours from Mission Street to Army Street.

(See #15 M Third and Kearny Street - Part II)

#19 M Polk - Larkin - 9th Street

The inner terminal of this coach line is 9th and Brannan Streets - the outer terminal Fisherman's Wharf.

On November 28, 1944, the Consulting Engineer recommended that the line be extended from 9th and Brannan Streets to the S. P. Depot at Third and Townsend Streets. The Public Utilities Commission have approved this recommendation, and as soon as approval is received from the Office of Defense Transportation, the extension can be made.

Coincidental with this change, the writer recommends that the #19 M line be operated with coaches only and that street car operations be discontinued.

Reference: Recommendation 11 - #19 M Polk - Larkin - 9th Street Coach Line - 11-28-44.

Also see #15 M Line - Part II

#23 M Richland Avenue

On January 13, 1945, the Consulting Engineer recommended that shuttle coach service be operated on Cortland Avenue and Crescent Avenue between Mission Street and Bayshore Boulevard. The Public Utilities Commission approved this recommendation and we are now awaiting approval from

[illegible]

[illegible]

[illegible]

the Office of Defense Transportation.

When the coach service is inaugurated on Crescent Avenue, the #23 M Richland Avenue line should be abandoned.

Reference: Recommendation 9 - Proposed Coach Lines - Cortland Avenue - Crescent Avenue - 1-13-45.

#24 M Castro - Divisadero - Fillmore

No route change recommended. It would be highly desirable to convert this line to a trolley coach operation as soon as possible. Grades encountered on this line make motor coach operation very expensive.

See #24 M Castro - Divisadero - Fillmore Line - Part 11

#25 M San Bruno Avenue

Coaches are operated on this line nights only on weekdays and Saturdays, day and night on Sundays and holidays.

On January 2, 1945, the Consulting Engineer recommended that when the "H" line is extended from Potrero Avenue and Army Street to San Bruno Avenue and Arleta Avenue, that the #25 M line be operated as a coach line from Army Street and Potrero Avenue to 4th and Mission Streets.

The Public Utilities Commission have approved this recommendation.

The Office of Defense Transportation have not approved this recommendation at this writing.

Reference: Recommendation 8 - "H" Line Extension.

#25 M San Bruno Coach Line

January 2, 1945 - January 12, 1945.

Also see # 25 M San Bruno Line - Part II.

#26 M Guerrero and Daly City

No change recommended at this time.

See 26 M Guerrero and Daly City Line - Part II.

#27 M Bryant Motor Coach

This coach line operates from 2nd and Market Streets to 26th and Mission Streets deviating from the route of the #27 M Bryant Street car line in that coaches serve the S. P. Depot at 3rd and Townsend Streets.

It is recommended that if the 27 M Bryant Street car line is abandoned as recommended in Part III that service on this line be increased by the addition of 4 coaches during the morning and evening rush hours.

See #27 M Bryant Street Line, Part III, for remarks on street car service.

#28 M Ferry - S. P. Depot

I recommend that this line be abandoned. Ample service is afforded by the #4 Embarcadero Coach Line.

In the Report and Recommendations on San Francisco Transit of the Office of Defense Transportation dated October 5, 1943, the following is stated:

> "Route 28 of the Market Street Railway running between the Southern Pacific Depot and the Ferry Building also will be eliminated, as good service is provided by Route 4 of the Municipal Railway".

[illegible]

[illegible]

[illegible]

#35 M 24th Street

I recommend that this line operate on 29th Street from Castro Street to Mission Street. Outer loop to be - 29th, Castro, 30th, Noe Streets. Inner loop to be - 29th, Mission, 30th, San Jose Avenue.

See #6 Eureka - Diamond Coach Line - Part IV

See #11 Mission and 24th Street Line - Part III

#44 M East Bay Terminal - Broadway - Sansome

No change recommended at this time.

#50 M Geneva Avenue

No change recommended at this time. When Defense Housing Project on Geneva Avenue between Bayshore Boulevard and the Cow Palace is completed, additional service on the #50 coach line should be provided.

#51 M Silver Avenue

No change recommended at this time.

#52 M Excelsior

No change recommended at this time.

#53 M Southern Heights

No change recommended at this time.

#54 M Hunter's Point

No change recommended at this time.

#55 M Sacramento - Clay

I recommend that this line be abandoned. Ample service is provided by the cable cars of the California Street Cable Railroad Company on California Street.

Abandonment of this line was recommended in the Report and Recommendations on San Francisco Transit of the Office of Defense Transportation, dated October 5, 1943, as follows:

> "When the Sacramento Street cable car line was discontinued, a bus line was substituted by the Market Street Railway. This line has been very irregular in operation, and the grades are so steep that a detour is necessary. The line will be discontinued. Service will be available on the cars of the California Street cable car line, one block away."

The Office of Defense Transportation recently instructed the Public Utilities Commission to abandon this line.

#70 M Hunter's Point Shuttle

Curtailment in service on Routes A and B of this line was recently requested of the U. S. Navy by the Consulting Engineer. The line is causing a loss of approximately $60.00 per day at the present time. The proposed curtailment should result in the line "breaking even".

Aside from this curtailment, no further change is recommended at this time.

All of the changes recommended can be made without purchasing additional motor coaches.

REPLACEMENT OF EXISTING MOTOR COACHES

As of April 1, 1945, the Municipal Railway owned 192 motor coaches. Four coaches are on order, yet undelivered, and an order for 20 additional coaches is to be placed.

Exhibit entitled "Age of Rolling Stock" indicates that the Municipal Division has 29 coaches which as of April 1, 1945, are over 5 years of age.

The Market Division has 75 coaches over 5 years of age as of April 1, 1945.

I consider 10 years the maximum, useful and economical life of a motor coach; therefore, it may be concluded that in the next 5 years at least 104 coaches of the present fleet should be replaced.

It is recommended, therefore, that provision be made to replace 104 coaches in the next five-year period, total cost estimated to be $1,549,600. (104 44-Passenger motor coaches @ $14,900 each, including freight and California Use Tax.)

CONSOLIDATED STATEMENT

MUNICIPAL RAILWAY OF SAN FRANCISCO

MARKET STREET RAILWAY COMPANY

PASSENGERS CARRIED

CALENDAR YEARS 1937 to 1943

PERIOD JANUARY 1, 1944 TO SEPTEMBER 28, 1944

Year	Revenue	Transfer	Total
1937	209,252,766	62,784,033	272,036,799
1938	189,113,478	52,938,347	242,051,825
1939	183,684,578	58,049,490	241,734,068
1940	173,665,534	59,490,564	233,156,098
1941	172,792,115	61,899,828	234,691,943
1942	209,892,087	72,086,468	281,978,555
1943	249,712,006	75,685,115	325,397,121
1944*	199,256,784	55,615,239	254,872,023
1944**	264,227,149	75,028,649	339,255,798

* Period January 1 to September 2 8, incl., 1944

** Period 12 mos. - January 1 to December 31, incl., 1944

4-2-45

CONSOLIDATED STATEMENT

MUNICIPAL RAILWAY OF SAN FRANCISCO

MARKET STREET RAILWAY COMPANY

TOTAL PASSENGERS CARRIED ANNUALLY PER VEHICLE OPERATED

Year	Total Number of Vehicles Operated	Passengers per Vehicle Annually
1937	552	492,820
1938	525	461,050
1939	635	380,683
1940	624	373,647
1941	639	367,280
1942	673	418,987
1943	662	491,536
1944	646	525,163

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

CONSOLIDATED STATEMENT

MUNICIPAL RAILWAY OF SAN FRANCISCO

MARKET STREET RAILWAY COMPANY

MAXIMUM NUMBER OF TYPES OF EQUIPMENT OPERATED

Year	Street Cars *	Motor Coaches	Trolley Coaches	Total
1937	515	28	9	552
1938	487	29	9	525
1939	543	83	9	635
1940	504	111	9	624
1941	473	150	16	639
1942	508	149	16	673
1943	504	141	17	662
1944	498	131	17	646

*Includes Cable Cars

4-2-45

CONSOLIDATED STATEMENT

MUNICIPAL RAILWAY OF SAN FRANCISCO

MARKET STREET RAILWAY COMPANY

MAXIMUM PASSENGER CARRYING CAPACITY OF MAXIMUM VEHICLES OPERATED

Assumption - Capacity of Street Car - 125 Passengers
Capacity of Trolley Coach - 65 Passengers
Capacity of Motor Coach - 65 Passengers

	Maximum Passenger Capacity		
Year	Street Cars*	Coaches	Total
1937	64,375	2,405	66,780
1938	60,875	2,470	63,345
1939	67,875	5,980	73,855
1940	63,000	7,800	70,800
1941	59,125	10,790	69,915
1942	63,500	10,725	74,225
1943	63,000	10,270	73,270
1944	62,250	9,620	71,870
1945**	68,705	10,270	78,975

*Includes Cable Cars

**At present

4-2-45

CONSOLIDATED STATEMENT

MINIMUM REQUIREMENTS OF THE CONSUMERS

MARKET STUDY, MALAYAN (PENANG)

MAXIMUM PRODUCTION CAPACITY CAPACITY OF MALAYAN VENTILATOR (PENANG)

Assumption - 2 months of Summer Sale - 1.5 M Ventilators

2 months of Spring Sales - 85 M Ventilators

7 months of Winter Sales - 65 M Ventilators

Year	Summer Sales	Spring Sales	Winter Sales	Total
1957	[illegible]	[illegible]	[illegible]	[illegible]
1958	[illegible]	[illegible]	[illegible]	[illegible]
1959	[illegible]	[illegible]	[illegible]	[illegible]
1960	[illegible]	[illegible]	[illegible]	[illegible]
1961	[illegible]	[illegible]	[illegible]	[illegible]
1962	[illegible]	[illegible]	[illegible]	[illegible]
1963	[illegible]	[illegible]	[illegible]	[illegible]
1964	[illegible]	[illegible]	[illegible]	[illegible]
1965	[illegible]	[illegible]	[illegible]	[illegible]
1966	[illegible]	[illegible]	[illegible]	[illegible]

Minimum Order Size

Max. Capacity

MARKET STREET RAILWAY COMPANY

STATEMENT OF STREET CAR, GAS COACH AND TROLLEY COACH MILEAGE
AND
MAXIMUM NUMBER OF ALL TYPES OF EQUIPMENT OPERATED
AND
PASSENGERS CARRIED

CALENDAR YEARS 1937 TO 1943
AND
PERIOD JANUARY 1, 1944 TO SEPTEMBER 28, 1944

PASSENGERS CARRIED

		Transfer		
Year	Revenue	Free	Revenue	Total
1937	141,972,109	31,992,565	13,760,918	187,725,592
1938	111,786,962	22,058,088	10,594,051	144,439,101
1939	95,563,767	34,018,755		129,582,522
1940	89,924,603	34,852,571		124,777,174
1941	89,854,617	36,386,670		126,241,287
1942	111,402,441	44,307,085		155,709,526
1943	124,700,490	44,390,717		169,091,207
1944*	94,762,444	31,049,349		125,811,793
Total	859,967,433	279,055,800	24,354,969	1,163,378,202

*Jan. 1, 1944 to Sept. 28, 1944 inclusive.

3-1-45

[illegible]

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

MARKET STREET RAILWAY COMPANY

STATEMENT OF STREET CAR, GAS COACH AND TROLLEY COACH MILEAGE AND MAXIMUM NUMBER OF ALL TYPES OF EQUIPMENT OPERATED AND PASSENGERS CARRIED

CALENDAR YEARS 1937 TO 1943 AND PERIOD JANUARY 1, 1944 TO SEPTEMBER 28, 1944

MILEAGE OPERATED

Year	Cable & Elec. Cars	Motor Coaches	Trolley Coaches	Total
1937	19,077,323	377,950	430,000	19,885,273
1938	17,463,928	438,125	431,168	18,333,221
1939	15,698,358	690,674	425,012	16,814,044
1940	13,424,977	3,198,373	420,872	17,044,222
1941	11,593,203	4,842,454	418,889	16,854,546
1942	11,390,327	5,527,152	421,314	17,338,793
1943	11,567,165	4,528,075	411,506	16,506,746
1944	8,474,440	3,517,346	284,363	12,276,149
Total	108,689,721	23,120,149	3,243,124	135,052,994

3-1-45

MARKET STREET RAILWAY COMPANY

STATEMENT OF STREET CAR, GAS COACH AND TROLLEY COACH MILEAGE
AND
MAXIMUM NUMBER OF ALL TYPES OF EQUIPMENT OPERATED
AND
PASSENGERS CARRIED

CALENDAR YEARS 1937 TO 1943
AND
PERIOD JANUARY 1, 1944 TO SEPTEMBER 28, 1944

	MAXIMUM NUMBER OF TYPES OF EQUIPMENT OPERATED			
Year	Cars	Motor Coaches	Trolley Coaches	Total
1937	306	11	9	326
1938	277	11	9	297
1939	332	54	9	395
1940	293	76	9	378
1941	260	115	8	383
1942	286	115	8	409
1943	278	105	8	391
1944	272	95	8	375
Total	2,304	582	68	2,954

3-1-45

MUNICIPAL RAILWAY OF SAN FRANCISCO

STATEMENT OF PASSENGERS CARRIED

CALENDAR YEARS 1937 TO 1943

AND

PERIOD JANUARY 1, 1944, to SEPTEMBER 28, 1944, INCLUSIVE

Year	Revenue Passengers	Other Passengers	Total Passengers
1937	67,280,657	17,560,274	84,840,931
1938	77,326,516	20,793,158	98,119,674
1939	88,120,811	24,509,469	112,630,280
1940	83,740,931	25,085,427	108,826,358
1941	82,937,498	25,905,636	108,843,134
1942	98,489,646	28,139,334	126,628,980
1943	125,011,516	31,575,091	156,586,607
1944*	104,494,340	24,708,608	129,202,948
Total	727,401,915	198,276,997	925,678,912

* January 1, 1944, to September 28, 1944, inclusive.

4-2-45

MUNICIPAL RAILWAY OF SAN FRANCISCO

STATEMENT OF STREET CAR AND COACH MILEAGE OPERATED
AND
MAXIMUM NUMBER OF STREET CARS AND COACHES OPERATED

CALENDAR YEARS 1937 to 1943
AND
PERIOD JANUARY 1, 1944 to SEPTEMBER 28, 1944

	MILEAGE OPERATED			
Year	Street Cars	Motor Coaches	Trolley Coaches	Total
1937	8,235,337	730,843	-	8,966,180
1938	8,757,594	796,887	-	9,554,481
1939	8,987,748	1,035,889	-	10,023,637
1940	8,614,489	1,529,935	-	10,144,424
1941	8,112,000	2,027,909	**100,782	10,240,691
1942	8,404,796	1,961,654	329,442	10,695,892
1943	9,542,448	1,984,455	345,918	11,872,821
* 1944	7,317,305	1,489,442	273,632	9,080,379
Total	67,971,717	11,557,014	1,049,774	80,578,505

*Jan. 1, 1944 to Sept. 28, 1944 incl.
**September to December 1944 - 4 months only

3-1-45

MUNICIPAL RAILWAY OF SAN FRANCISCO

STATEMENT OF STREET CAR AND COACH MILEAGE OPERATED
AND
MAXIMUM NUMBER OF STREET CARS AND COACHES OPERATED

CALENDAR YEARS 1937 to 1943
AND
PERIOD JANUARY 1, 1944 to SEPTEMBER 28, 1944

MAXIMUM NUMBER OF STREET CARS AND COACHES OPERATED

Year	Street Cars	Motor Coaches	Trolley Coaches	Total
1937	209	17	-	226
1938	210	18	-	228
1939	211	29	-	240
1940	211	35	-	246
1941	213	35	** 8	256
1942	222	34	8	264
1943	226	36	9	271
*1944	*226	36	9	271
Total	1,728	240	34	2,002

* Jan. 1, 1944 to Sept. 28, 1944 incl.
** September to December 1944 - 4 months only

3-1-45

MUNICIPAL BUREAU OF SAN FRANCISCO

STATEMENT OF PATENT CAR AND COLOR MILEAGE OPERATED
AND
MAXIMUM NUMBER OF ATTENDANT CARS AND COLORS OPERATED

"FLEETWOOD" ITEM'S 1927 TO 1943
AND
VERSUS DEC. 31, 1944 TO SEPTEMBER 28, 1941

MAXIMUM NUMBER OF PATENT C.-S. AND TOURING CARS OPERATED

Year	Street Cars	Motor Coaches	Trolley Coaches	Total
1927	295	17	-	295
1928	310	18	-	328
1929	311	29	-	340
1930	311	35	-	346
1931	313	36	** 6	355
1932	307	34	8	341
1933	298	36	8	371
1934	*225	38	8	271
Total	1,758	200	30	2,002

* Jan. 1, 1934 to Sept. 28, 1934 incl.
** September to December 1934 - 4 months only

POPULATION FORECAST

In order to determine or estimate rolling stock requirements in the postwar period of five years commencing immediately after the end of the war with Japan and, further, assuming the war with Germany will have ended before defeat of Japan, the Consulting Engineer has made study of population estimates, trends and forecasts made by several organizations.

These will be reviewed herewith:

Pacific Gas and Electric Company

This Company has completed Postwar Study No. 1 on Population as a part of their program of Market Studies to determine and guide their postwar activity in the various trading areas within the territory of Northern and Central California served by them.

They estimate the population trend of the City and County of San Francisco as follows, military population not included.

POPULATION

Actual -- 1940	634,536
Estimated as of	
December 31, 1943	702,768
" 31, 1944	706,768
" 31, 1945	706,768
" 31, 1946	698,102

EXPLANATORY FOREWORD

In order to determine the estimated polling strength requirements in the primary period of five years preceding immediately after the end of the war, we have taken, first, assuming the war situation will come to an end before January 1, 1945, the Conversion Department has made study of production schedules in the industries which in regard regardless;

Their will be involved Production:

Profits Due and Electric Service

This Department has completed Power Study No. 1 on Population in 1 part of their program of Power Studies in Operation and plan their power activity in the building building there within the territory of Jackson and County Contiguous served as follows.

This indicates the population based on the City and County of Ann Arbor as Primary, military population not included.

Population

Census - 1940	62,424
Estimates - 1 of	
December 31, 1942	70,700
" Jan. 1944	75,000
" Jan. 1945	75,000
" Jan. 1946	80,000

POPULATION

Estimated as of

December 31, 1947 ---------- 701,668

" 31, 1948 ---------- 712,902

" 31, 1949 ---------- 726,902

" 31, 1950 ---------- 738,568

Estimated increase from --

December 31, 1944 to December 31, 1949 ---------- 20,134

Estimated per cent increase in above 5 year period - 2.8%

In arriving at the above estimates, they say --

"The data included here are independent and conservative forecasts of the Population Trends. They have been considered carefully. They include most factors which have a bearing on postwar population expectations. This is a basic study which will have a definite bearing on studies to follow."

They estimate the population trend of the trading area in San Mateo County from the County Line on the north to Belmont on the south, as follows:

POPULATION

Actual - 1940 ---------- 71,599

Estimated as of

December 31, 1943 ---------- 88,384

" 31, 1944 ---------- 86,787

POPULATION

Estimated as of

December 31, 1945	----------	85,509
" 31, 1946	----------	87,517
" 31, 1947	----------	89,889
" 31, 1948	----------	92,639
" 31, 1949	----------	94,639
" 31, 1950	----------	96,639

Estimated increase from --

December 31, 1944 to December 31, 1949 ---------- 6,255

Estimated per cent increase in above 5 year period --- 7.2%

One large organization representing business and industry in San Francisco have given the Consulting Engineer their opinion on Population Trends as follows:

"After careful consideration of your requests, (1) the estimated population of San Francisco by the end of 1946, (2) will there be a decrease in population immediately following the end of the war, if so, how much, and (3) estimate of city's population two years after the war ends (1948), we have arrived at the following conclusions.

"Starting with the U.S. Census figure for San Francisco as of April 1, 1944 - 700,735 resident civilians and 85,855 military residents - and the National Housing Agency constructic

program for San Francisco since the beginning of the emergency, we have assumed that the city's population at the end of 1946 will be governed by the available housing as of that date, just as it is at present.

"We have projected the housing facilities through 1946 at the same rate of construction as during the past emergency period, arriving at a total of 737,900 resident civilians. To this we should add the 85,855 resident military as of April 1, 1944, and if we allow an additional 21,000 which is approximately a 25 per cent increase for stepping up of the war effort in the Pacific, total resident military would become 106,855, which combined with resident civilian would total 844,755 persons as of the end of 1946.

"Referring to question No. 2 concerning the possible decrease in population immediately following the end of the war, here the reflection in the crystal ball becomes a little disturbed as there seem to be three major factors which will have an important effect, namely: (1) the shift of the military residents which are estimated at the end of 1946 at 107,000; (2) the civilians now living in temporary dormitories and crowded into hotels to the point where there is an average of 1.6 persons per room, and; (3) the rate of out-migration, which has been determined on the basis of shipyard studies at about 20 per cent of the in-migrants. There

is also the factor of new population desiring to settle here and to join in the world-famed activities of the San Francisco Bay Area.

"What the net results of those factors will be, will depend largely on the general national picture of being able to maintain full employment. While it is reasonable to assume there will be some outward migration, it is also likely that it can be counterbalanced by the in-migration. This possibility is borne out by the fact that on April 1, 1944, there were 150,000 in-migrants in San Francisco who were not here in 1940, yet the net population increase over 1940 amounted to only 66,000 people. If we were to assume that the civilian in-migrants would balance the out-migrants, and the military continued through this port as a debarkation center, there would still be much activity immediately at the war's end. However, during the ensuing months, the permanent forces would shrink. If this is reduced 75 per cent in the first six months, we would have left but 26,711 resident military, bringing the total resident population down to 759,611.

"In connection with Question No. 3 concerning the population two years after the war ends (1946 according to your assumption). if we are constructive and assume the country is able to establish a full employment program, San Francisco could assume that in addition to the replacement of temporary

housing with permanent dwellings, there would be a demand for additional housing by new in-migrants, which in turn would be directly related to the rate of residential construction that could be maintained in San Francisco. During 1941 nearly 7,000 family accommodations were provided. If such a building rate could be established in the first two postwar years, it would be possible to provide 14,000 family units, which at the rate of three persons per family would provide shelter for 47,000 persons. This population added to the 1946 civilian population of 737,900, plus an additional 15,000 for permanent military, would bring the total to 799,900. To this should be added the returning residents who are now in the Armed Forces. This figure is not available, but is probably between 40,000 and 50,000. So the overall 1948 total could be between 825,000 and 850,000."

San Francisco Population (Authority S. F. Chamber of Commerce)

The resident civilian population of San Francisco City and County was as follows for the years shown:

1937 --- 634,498

1938 --- 634,512

1939 --- 634,525

1940 --- 634,536 (U. S. Census -- 4-1-40)

1941 --- 640,900

1942 --- 651,000

1943 --- 690,000

1944 --- 700,735 (U. S. Census -- 4-1-44)

1944 --- 737,900 (December 31, 1944, estimated)

It is fully realized that any population forecast is speculative.

Assuming the war with Germany will end during 1945 and, further, assuming the war with Japan will end by December, 1946, then I forecast San Francisco population as follows, at year end for years shown:

Year	Civilian	Military	Total
1946	690,000	106,855	796,855
1947	700,000	26,711	726,711
1948	710,000	15,000	725,000
1949	725,000	10,000	735,000
1950	735,000	10,000	745,000

According to the San Francisco Chamber of Commerce the resident civilian population on December 31, 1944 was 737,900. The resident military population was 85,855; hence total resident population was approximately 823,755.

Engineers of the Pacific Gas and Electric Company and the author of this report forecast a decrease in population in San Francisco of almost 100,000 persons by 1950. This decrease in population has a very material bearing on the magnitude of transportation requirements in San Francisco during the postwar period.

MASS TRANSPORTATION - SAN FRANCISCO

RIDING HABIT

POPULATION - (S.F. Chamber of Commerce)
(Resident Civilian)

1937	634,498	
1938	634,512	
1939	634,525	
1940	634,536	(U.S. Census 4-1-40)
1941	640,900	
1942	651,000	
1943	690,000	
1944	700,735	(U.S. Census 4-1-44)

REVENUE PASSENGERS - (Consolidated System)

1937	209,252,766
1938	189,113,478
1939	183,684,578
1940	173,665,534
1941	172,792,115
1942	209,892,087
1943	249,712,006
1944	264,227,149

RIDING HABIT - (Revenue Passengers per Capita)

1937	329
1938	298
1939	289
1940	275
1941	269
1942	322
1943	361
1944	377

FORECAST OF REVENUE PASSENGERS

MUNICIPAL RAILWAY OF SAN FRANCISCO

Assumption: Riding Habit will be 272 rides per capita per annum based upon average riding in 1940 - 1941.

Military resident population not considered.

1946	187,680,000
1947	190,400,000
1948	193,120,000
1949	197,200,000
1950	199,920,000

4-2-45

POSTWAR ROLLING STOCK

The new modified President's Conference Cars recommended for replacement of street cars on primary lines should be designed so as to insure the following characteristics.

(a) Suitable for operation in subway or private right of way in tandem or train formation. Proper electric and air control and car connections must be designed and provided. Also proper electric wiring must be provided to make possible addition of third rail shoes for current collection, should it be desired at future date to operate the cars in a subway or private right of way.

(b) Weight of cars to be held to a minimum through use of light weight alloys, consistent with safety in event of accident or collision.

(c) Improved ventilation. Present P.C.C. cars are not ventilated as well as they should be to provide maximum rider comfort. Through proper design features, the new cars must be provided with adequate provision for heating the air when weather conditions demand, with adequate filtered change of air to provide comfortable condition even during the peak rush hour periods when maximum loads are carried.

(d) Improved Lighting. New cars must be provided with adequate lighting so that seated passengers may read in comfort; further, that during the peak hours standees will not interfere with lighting for seated passengers; further, that platform and step lighting is adequate to provide safe loading and unloading of passengers, permit of adequate light for conductor to insure proper fare collection. There is no reason why the lighting in the new street car should not be just as adequate and efficient as modern office lighting.

(e) Quietness. The new cars must be quiet in their operation. While the present P.C.C. car is a vast improvement over the old street car in this regard, there is considerable room for improvement. Throught the further use of sound-proofing insulation and by the further use of rubber and anti-friction material in truck and body construction, further quietness can be obtained.

(f) Seating. Comfortable and roomy seating must be provided in the street car of the immediate post war period. The adequate and luxurious seating of even the lowest price range motor cars gives a good indication of the need for similar design in street cars to achieve the desired result.

(g) Interior Treatment. The new cars must compete for patronage with the motor car. The interior of the new car must be modern, restful and altogether pleasing. This I believe is

especially important in attracting feminine patronage. Incidentally, in the postwar period their patronage in the non-rush hours is imperative to the financial success of public transportation.

Floor treatment must be such that cleaning operation may be readily and thoroughly performed. Slope of floor under seats should be toward center of car. Provision for drainage should be made so that car floors may be readily washed. Sharp corners which catch dirt should be eliminated.

Interior finish should be such as to lend itself to washing. Chrome or metal fittings should be eliminated in favor of plastics wherever possible and within structural stress and strain range.

(h) Performance. The new car must have a performance ability equal or superior to the postwar automobile.

(i) Safety. The new car will be vastly safer than the present "old type" street car.

Control must be simple and require no more effort in operating than the present automobile. Controls must have instantaneous response in keeping with the car's performance.

Adequate and sure braking methods must be in keeping with car's performance ability.

Both front and rear doors must be closed before car ca

[illegible] [illegible] in [illegible] [illegible] [illegible]. [illegible] [illegible] [illegible]

be placed in motion. Operator should have visual signal that doors are closed; further, current and brake interlock should be provided to the end that human error cannot be made and car started when doors are open.

Windshield should be so constructed and set in the car body to eliminate glare. Proper provision should be made so that car operator in seated position has full and adequate visibility of the ground immediately ahead of the right front corner of the car.

Window glass should be shatter-proof. The use of new types of shatter-proof glass or plastic substitutes should be given full consideration.

(j) Destination Signs. Car must be equipped with destination signs visible from the street both day and night.

Sign on the front of the car should preferably be below the windshield and of the "Hunter" type. Two signs of the "Hunter" type should likewise be provided on the sides of the car at both endsbeside the doors and below the window lines

Placing signs as near the normal line of vision as possible will eliminate much confusion.

(k) Motor Ventilation. To prolong the life of electric motors, adequate forced filtered air ventilation should be

be placed in motion. Instead should one wheel slipped, then there was already friction, however, any other irregularities should be provided to the end that should there occur no shock and may actually come down and open.

Hydraulic brake is to be connected and is in the hub only in alternate place. Brake provided should be such so that the operator or driver controls the full and therefore stability of the vehicle from danger of the side.

Shock pipes should be accomodated. The use of the types of accumulators pipes or electric accumulators should be given full consideration.

(i) Transmission Gears. The gears be equipped with brakes. Also slight vibrations from the engine both by and slight.

Also in the lower of the gears should particularly be below the standard and of the "Lowest" type. The gears of the "Reverse" type should likewise be provided in the order of the use of such accessories the drive and large engineering lines.

Electric gears be made the normal line of vehicle or provided with interior main driveline.

(k) Back-Propulsion. In spite of the fact of already driver, engineers have found difficult the controlling amount of

provided. Motor cases must be water and dust tight. This is of particular importance in San Francisco due to severity of grades encountered, which form of operation increases very materially the operating temperature of street car motors.

(1) Stanchions. Stanchions and grab handles should be placed within the car, sufficient in number and so placed that a passenger has a suitable place to hold on to, from the rear to the front platform.

It is important to design adequate support for passengers in the center of the aisles, as well as those occupying positions beside the seats.

The trolley coaches of the postwar period should have incorporated in their design the same improvements that I have indicated as being desirable in the P.C.C. street car.

The motor coaches of the postwar period must be vastly improved in design if their wide usage is to continue and if they are to compete in popular acceptance by management and passengers alike.

Specifically, the following improvements seem imperative:

(a) Vehicle weight must be reduced 16,000 to 18,000 lbs., vehicle weight for the 40-44-passenger vehicle is much too high. Through the use of light weight alloys, a weight reduction of 2,000 to 4,000 lbs. does not seem unreasonable.

(b) Fuel Economy. The average 40-44-passenger motor coach in city service consumes 1 gallon of gasoline for every 3 to 3½ miles travelled. Fuel cost of these vehicles is entirely too high.

Through reduction in vehicle weight, improvement in carburetion, manifolding, and overall engine design, a fuel performance of 5½ to 6 miles per gallon of gasoline appears possible.

(c) Vehicle Maintenance. The cost of motor coach maintenance compared with electric vehicle maintenance is entirely too high. For example, 9 trolley coaches in the Haight Street Division, 8 of which were placed in service in October, 1935, have been maintained by two men, a ratio of 4-1 vehicles per man.

Gasoline motor coaches on the other hand require at least 1 man for every two vehicles--in other words, at least twice the maintenance manpower required by the electric vehicle.

(d) Gasoline vs. Diesel. It would appear that the gasoline engine of the postwar period will be one with a high compression ratio--at least 7½--8 to 1. High octane fuel will be required, and it is to be presumed that fuel cost will be at least that of the present time. Fuel economy of the new engine must offset increased fuel cost.

It is interesting to note that gasoline engines in busses have not materially changed in design features since 1924. True, compression has been raised slightly, carburetion and ignition somewhat improved, but basically, the engines of 1941 were substantially the same as 1924.

On the other hand, the 2-cycle Diesel engine has been placed on the market within recent years, and is vastly superior to the equivalent gasoline engine in fuel economy and maintenance cost.

(e) Noise. The postwar gasoline or Diesel coach must be designed so as to eliminate much of the noise of the present vehicle.

AGE OF ROLLING STOCK

STREET CARS

MUNICIPAL DIVISION

Number of Cars	Car Numbers	Date Received	Age 4-1-45
43	1 - 43 Incl.	(20) 12 - 1912	33 Yrs.
		(23) 6 - 1913	32 "
124	44 - 49 Incl.		
	51 -168 Incl.	(124) 8 - 1914	31 Yrs.
21	351 -371 Incl.	(1) 3 - 1921	24 Yrs.
		(20) 11 - 1922	23 "
25	189 -213 Incl.	(15) 6 - 1927	18 "
		(10) 3 - 1928	17 "
5	1001 -1005 "	(2) 10 - 1939	6 Yrs.
		(3) 12 - 1939	6 Yrs.
Total 218			

Average Age - 29 Years

167 cars - 76.5% - 25 Years or Over

[illegible]

MOTOR COACHES

MUNICIPAL DIVISION

Number of Coaches	Coach Numbers	Date Received	Age 4-1-45
3	034-035-036	12-13-34	11 yrs.
2	037-038	10-23-36	9 yrs.
2	039-040	(1) 5-27-37 (1) 6-4-37	8 yrs.
4	041-044 Incl.	(1) 3-24-38 (3) 3-31-38	7 yrs.
6	045-050 Incl.	(1) 11-24-38 (2) 11-25-38 (2) 11-28-38 (1) 11-30-38	7 yrs.
12	051-062 Incl.	(6) May-1939 (2) June 1939 (3) July 1939 (1) Aug. 1939	6 yrs.
10	063-072 Incl.	Mar. 1941	4 yrs.
2	073-074	Apr. 1941	4 yrs.
4	075-078 Incl.	Dec. 1944	1/4 yr.
8	079-086 Incl.	Jan. 1945	1/4 yr.
3	087-089 Incl.	Feb. 1945	1/4 yr.
12	090-0101 Incl.	Mar. 1945	1/12 yr.
Total 68			

Average Age 3.8 yrs.

17 Coaches - 25% - 7 yrs. old or over

27 Coaches - 40% - New

TROLLEY COACHES

MUNICIPAL DIVISION

Number of Coaches	Coach Numbers	Date Received	Age 4-1-45
9	501 - 509 Incl.	Apr. May 1941	4 years

[illegible]

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

STREET CARS

MARKET DIVISION

Number of Cars	Car Numbers	Date Built	Age 4-1-45
79	101 - 122 Incl. 124 - 180 Incl.	1911 1911	34 years
65	201 - 265 Incl.	1913	32 years
20	266 - 285 Incl.	1920	25 years
20	286 - 305 Incl.	1924 1925	20 years
144	778 - 894 Incl. 896 - 922 Incl.	1923 1923	22 years
2	942 - 943 Incl.	1930	15 years
19	923 - 941 Incl.	1931	14 years
45	944 - 988 Incl.	1932	13 years
5	990 - 994	1933	12 years
1	1225	1903	42 years
16	1227 - 1238 Incl. 1241 - 1244 Incl.	1922 1922	23 years
1	735	1918	27 years
9	740 - 744 Incl. 746 - 749 Incl.	1927 1927	18 years
1	989	1933	12 years
9	1553 1572 1583 1595 1599 1715 1716 1722 1731	1907 1907 1907 1907 1907 1907 1907 1907 1907	38 years
1	San Francisco	1904	41 years
Total 437	Average Age - 24 years		

176 cars - 40% - 25 years or over

CABLE CARS

MARKET DIVISION

Number of Cars	Car Numbers	Type	Date Built	Age 4-1-45
* 11	15 - 23 Incl. 25 - 26 Incl.	Sacramento St.	1907	38 yrs.
27	501 - 527 Incl.	Powell St.	1893	52 yrs.

* Sacramento Street cars not used.

The Powell Street cars are 52 years old. They were rebuilt in 1923.

[illegible]

[illegible]

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

[illegible]

MOTOR COACHES

MARKET DIVISION

Number of Coaches	Coach Numbers	Date Received	Age 4-1-45
2	7 - 8	1932	13 yrs.
1	21	1932	13 yrs.
2	25 - 26	1937	8 yrs.
2	27 - 28	1938	7 yrs.
12	30 - 41 Incl.	1939	6 yrs.
12	60 - 71 Incl.	1939	6 yrs.
4	73 - 76 Incl.	1940	5 yrs.
10	101 -110 Incl.	1939	6 yrs.
10	111 -120 Incl.	1940	5 yrs.
2	121 -122	1940	5 yrs.
7	201 -207 Incl.	1940	5 yrs.
11	301 -311 Incl.	1940	5 yrs.
9	151 -159 Incl.	1941	4 yrs.
30	401 - 430 Incl.	1941	4 yrs.
6	160 - 165 Incl.	1942	3 yrs.
3	431 - 433 Incl.	1942	3 yrs.
1	166	1942	3 yrs.
Total 124			

Average Age - 5 yrs.

7 Coaches - 5.6% - 7 yrs. old or over

TROLLEY COACHES

MARKET DIVISION

Number of Coaches	Coach Numbers	Date Received	Age 4-1-45
9	51 - 59 Incl.	1935	10 yrs.

MAXIMUM CAR HOURS OPERATED AT PRESENT BY CLASSES OF VEHICLES

Street Car		Hours per Week
Weekday ---	7,093 Hrs.	35,465
Saturday ---	6,876 "	6,876
Sunday ---	4,811 "	4,811
	Total	47,152

Cable Car		
Weekday ---	171 Hrs.	855
Saturday ---	171 "	171
Sunday ---	131 "	131
	Total	1,157

Motor Coach		
Weekday ---	2,080 Hrs.	10,400
Saturday ---	1,997 "	1,997
Sunday ---	1,798 "	1,798
	Total	14,195

Trolley Coach		
Weekday ---	247 Hrs.	1,235
Saturday ---	247 "	247
Sunday ---	185 "	185
	Total	1,667

[illegible]

[illegible]

[illegible]

COMPARATIVE STATEMENT

Number of Vehicles Scheduled 4-1-45 as Compared with Number of Scheduled Vehicles Proposed for Operation Postwar

Type	Number of Vehicles Scheduled 4-1-45	Number of Vehicles Proposed for Schedules
Street Cars	538	289
Trolley Coaches	18	220
Cable Cars	12	12
Motor Coaches	152	273
Total	720	794

Increase in number of Vehicles proposed for scheduled use------74 ---------- 10%

CARRYING CAPACITY

Type	Scheduled Vehicles 4-1-45	Scheduled Vehicles Proposed
Street Cars	67,250	36,125
Trolley Coaches	1,170	14,300
Cable Cars	1,080	1,080
Motor Coaches	9,880	17,745
Total	79,380	69,250

Decrease in carrying capacity of scheduled proposed vehicles------10,130 ---------- 12%

Assumption:

Carrying Capacity:

Street Car - - - - - -	125	Passengers
Trolley Coach - - - -	65	"
Motor Coach - - - - -	65	"
Cable Car - - - - - -	90	"

TROLLEY COACH OPERATION IN AKRON, OHIO

The Akron Transportation Co.

Year 1944	Street Cars	Motor Buses	Trolley Coaches
No. of Vehicles	18	170*	32
Seating Capacity	972	6,330	1,348
Passengers Carried	9,270,852	40,234,820	18,467,356
Vehicle Miles	828,961	5,703,506	1,672,225

*Includes 20 leased Army buses used in Aircraft Operation.

The Akron Transportation Co. has shouldered immense burdens imposed by the war emergency with the help of trolley coach service.

This service was first introduced in Akron in November of 1941, less than a month before Pearl Harbor. At that time trolley coaches replaced street cars on East Market Street and gas buses on Grant Street when 12 trolley coaches were used for the replacement. The modernization of these two lines met with immediate public acclaim.

Within a short time it was decided to convert the West Market Street gas bus route to trolley coach operation. Akron Transportation Co. added twenty(20) 44-passenger trolley coaches to its original fleet, bringing the total number of

these units to 32. Service on this line was begun in September, 1942, and traversed one of the best residential sections in Akron.

With but 15.6 per cent of the seating capacity and traveling only 20.4 per cent of the total vehicle miles, trolley coaches carried 27.2 per cent of the revenue passengers. This is partly due to their ability to easily negotiate Akron's many steep hills while loaded to full capacity, their maneuverability in traffic and their speed.

TROLLEY COACH OPERATION IN SEATTLE, WASHINGTON

Seattle Transit Co.

A new issue of $6,000,000 transportation system revenue refunding bonds was awarded in November to Blyth & Company and associates by the City of Seattle, on a tender of 101.67 for 1-3/4 per cent securities due 1946 to 1956. This issue is not to be reoffered publicly.

Operating at a loss for many years, Seattle's transit system had an indebtedness of some 13 million dollars in 1939. Modernization was started that year, and refinancing was carried out through the sale of $10,700,000 4½ per cent revenue bonds.

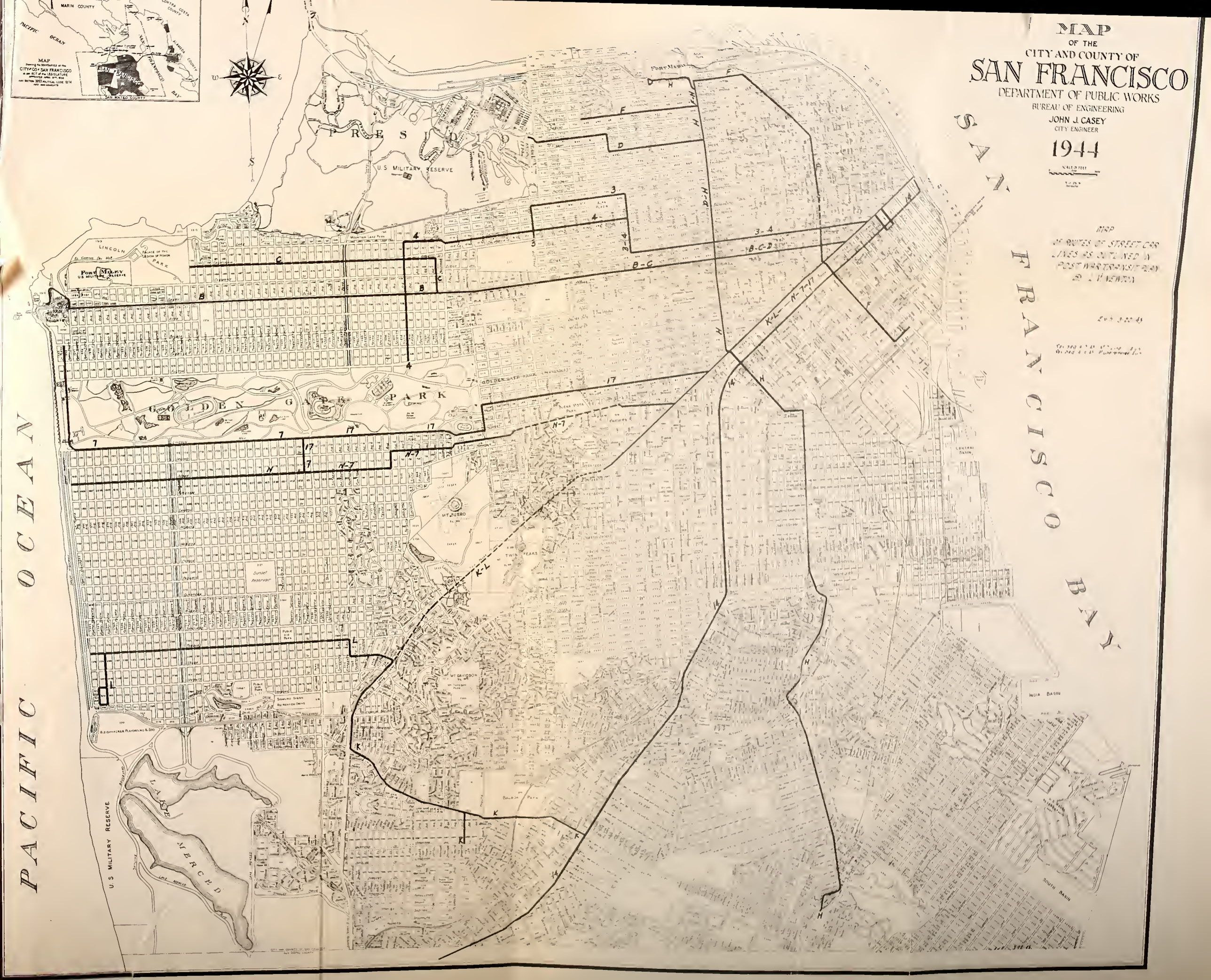
Under that plan, approximately $4,500,000 was used to retire old debts, and $6,200,000 was used for trolley coach modernization. According to John A. Beeler, who handled the modernization plans, the ratio of operating costs had been reduced from 108 per cent to 75 per cent; and the interest charges from 11.8 per cent to 3.6 per cent by 1943. Operations which resulted in a deficit of approximately $900,000 for 1938 were transformed into a surplus of $2,005,000 by 1943, after all interest charges had been paid.

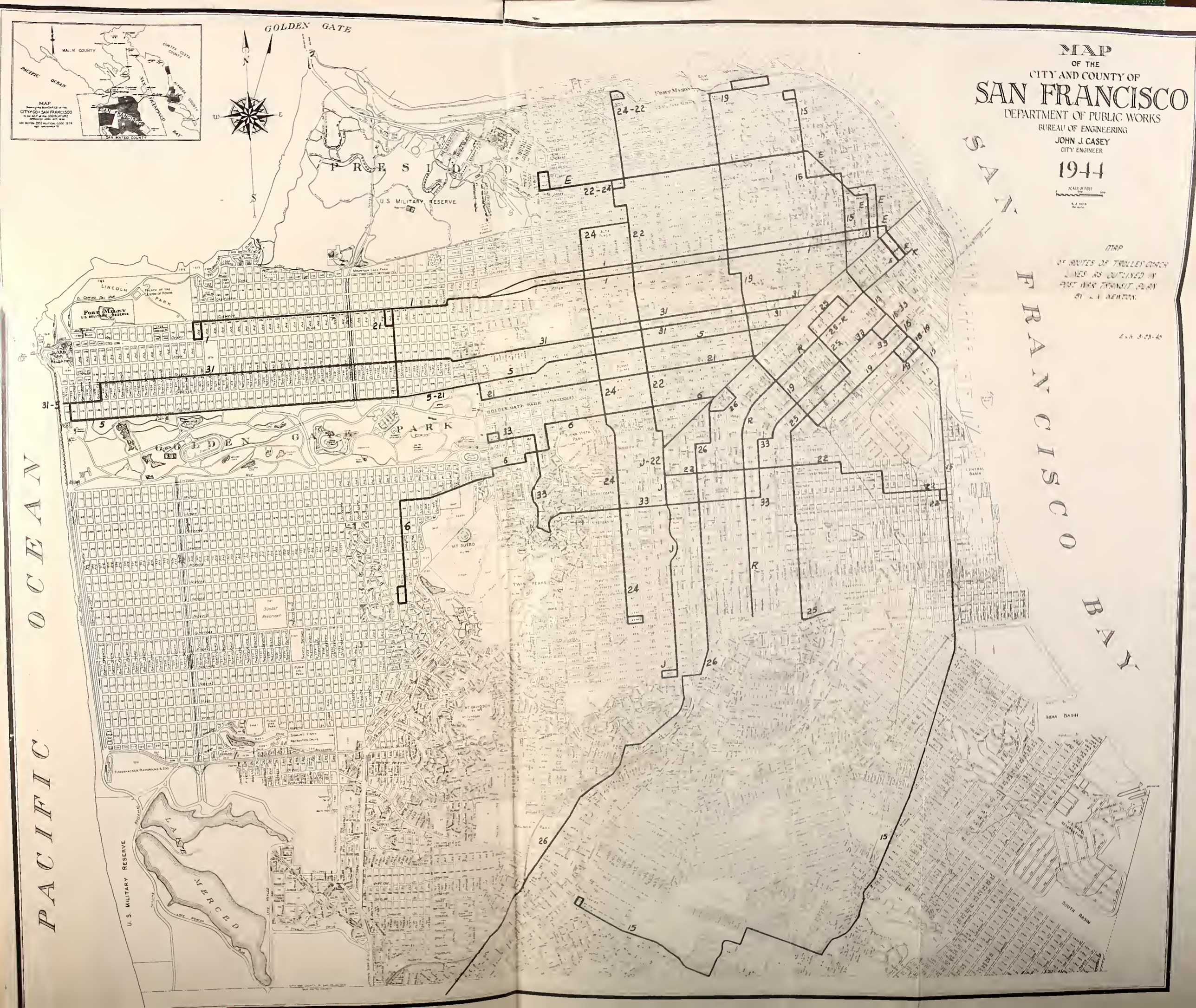
Bonded indebtedness has been reduced from $10,700,000 to a present level of $7,500,000 with a rate of interest of

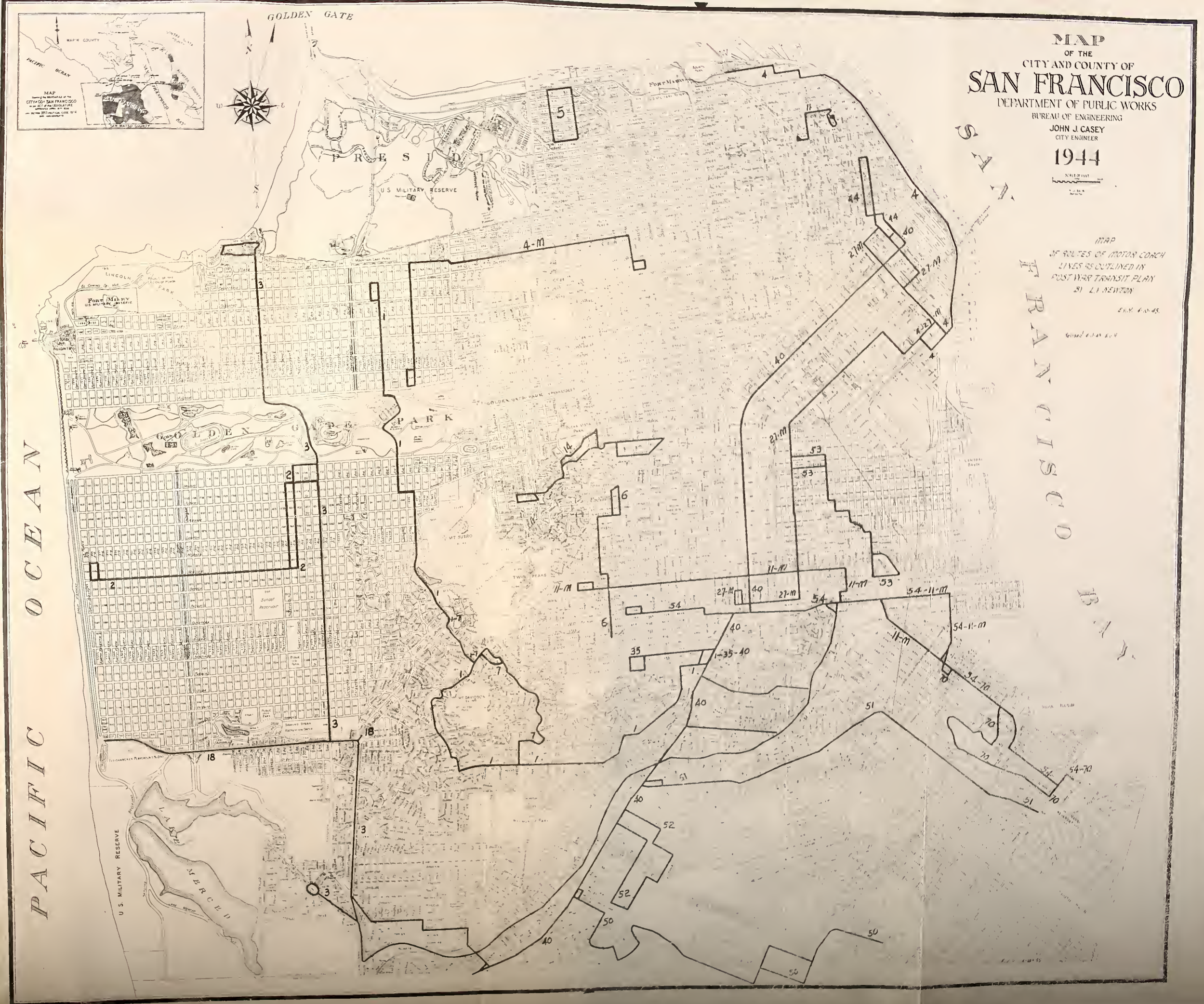
3½ per cent prior to the new refunding.

In 1943, revenue for trolley coaches was 49.85 cents per mile, and 31.37 cents for motor buses. The net balance, after expenses, was $2,462,606 for trolley coaches, against a deficit of $47,700 for motor buses; or 18.67 cents per mile profit for trolley coaches, and 0.50 cents per mile deficit for motor buses.

Seattle is the only large municipally owned and operated transit system that was completely modernized with trolley coaches before the start of the war.


MAP
OF THE
CITY AND COUNTY OF
SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING
JOHN J. CASEY
CITY ENGINEER
1944
PACIFIC OCEAN
SAN FRANCISCO BAY
PRESIDIO
U.S. MILITARY RESERVE
GOLDEN GATE PARK
LINCOLN PARK
PORT MILLER
U.S. MILITARY RESERVE
LAKE MERCED
MARIN COUNTY
CONTRA COSTA COUNTY
ALAMEDA COUNTY
SAN MATEO COUNTY
SAN FRANCISCO
MT. SUTRO
TWIN PEAKS
MT. DAVIDSON
INDIA BASIN
SOUTH BASIN
Sunset Reservoir
B-C
B-C-D
3-4
K-L
N-7-17
N-7
D-H


MAP
OF THE
CITY AND COUNTY OF
SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING
JOHN J. CASEY
CITY ENGINEER
1944
GOLDEN GATE
PACIFIC OCEAN
SAN FRANCISCO BAY
PRESIDIO
U.S. MILITARY RESERVE
GOLDEN GATE PARK
LINCOLN PARK
FORT MASON
FORT MILEY
U.S. MILITARY RESERVE
LAKE MERCED
U.S. MILITARY RESERVE
MT SUTRO
TWIN PEAKS
MT DAVIDSON
INDIA BASIN
SOUTH BASIN
CENTRAL BASIN
Sunset Reservoir
MARIN COUNTY
CONTRA COSTA COUNTY
ALAMEDA COUNTY
SAN MATEO COUNTY
SAN FRANCISCO


MAP
OF THE
CITY AND COUNTY OF
SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING
JOHN J. CASEY
CITY ENGINEER
1944
MAP
OF ROUTES OF MOTOR COACH
LINES AS OUTLINED IN
POST WAR TRANSIT PLAN
BY L.I. NEWTON
GOLDEN GATE
PACIFIC OCEAN
SAN FRANCISCO BAY
PRESIDIO
U.S. MILITARY RESERVE
GOLDEN GATE PARK
FORT MASON
U.S. MILITARY RESERVE
LAKE MERCED
U.S. MILITARY RESERVE
MT SUTRO
TWIN PEAKS
MT DAVIDSON
CENTRAL BASIN
4-M
11-M
27-M
54-11-M
54-70
1-35-40